EFFECTS OF PARENTAL NOTIFICATION AND CONSENT LAWS ON TEENAGE BIRTHS AND ABORTIONS IN TEXAS

A Dissertation

by

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ABSTRACT

Teen pregnancy and teen abortions are major public health concerns in the United States. The more than 300,000 births to teens each year often involve increased risk to the health of the mother and the baby. Teenage pregnancy and births also raise a variety of related political, clinical, social, and economic concerns. To make effective recommendations regarding contraception, teenage pregnancy, abortion, and sexual education programs, researchers must produce empirical evidence, which accurately evaluates policy options for persons involved in public health policy and legislation.

This study investigated the effect of parental notification and consent laws on teen births and abortions in Texas. This research examined health data of females aged 13 - 21 from Texas for 1995 through 2009. In January 2000, Texas enacted a law requiring a medical provider to notify the parents of a minor female seeking an abortion, before performing the abortion. In 2005, the law changed, requiring notarized parental consent in addition to notification for an unemancipated minor to receive an abortion.

Teenage birth and abortion rates, as well as other health outcomes related to pregnancy were analyzed. The data included years before notification laws (1995 – 1999), the years following enactment of the notification law (2000 – 2004), and the most current data following the more rigid consent law (2005 – 2009). The analysis used a time-series approach, specifically Auto Regressive Integrated Moving Average (ARIMA) model-fitting processes, to identify any changes in the patterns of the dependent variables resulting from this legislation.

Overall, parental notification and consent laws did seem to have an effect on birth and abortion rates for minors in Texas. Specifically, notification laws seemed to have the greatest impact on 16 – 17 year old females, reducing birth and abortion rates. Results were mixed in terms of the effect of the more stringent consent laws and the overall impact of both laws on health outcomes. Findings did differ by race/ethnicity category.

DEDICATION

This work is dedicated to the loves of my life: Dawn, Logan, and Evan. Without your support this never would have happened.

Logan and Evan, this is vital information for you as you grow into women. Remember how important you are and what you can contribute to the world. You are amazing girls and will become even more amazing women. Do not let anyone limit you. Anything you think you can achieve, I promise you, you can and you will!

Dawn, I cannot thank you enough. You are my best friend and you mean everything to me. I learn from you every day what it means to be good, kind, honest, hardworking, and smart. I can only hope that for the rest of our lives I can work to support you and make you happy.

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INTRODUCTION

Teen pregnancy outcomes and teen abortions are major public health concerns in the United States (Maynard, 1998). There are more than 615,000 teenage pregnancies and approximately 300,000 births to teens each year. These pregnancies and births often result in additional health concerns for both the mother and the baby (CDC National Center for Health Statistics, 2005). Teenage pregnancies and births raise a wide range of political, clinical, social, and economic concerns (Center for Reproductive Health Research and Policy, 2006). Research shows teenage pregnancies are associated with increased physical, emotional, social, and economic concerns (Kirby, 2007). These issues present themselves through the duration of the pregnancy, the postpartum period, and in ongoing years as young parents.

Moral or religious grounds often provide a viewpoint for health care policies related to sexually active teens, the provision of contraception, sex education, pregnancy, and abortion (Henshaw & Kost, 1992). While these considerations require attention, decisions regarding contraception, teenage pregnancy, abortion, and sexual education programs should include quantified evidence that accurately determines the effects of different choices for public health policy. The issue of adolescent rights in reproductive health care is one that is sensitive and volatile, yet it is critically important in the ongoing research involving the prevention of sexually transmitted illnesses and teenage pregnancy. Although recognizing the declining trend in teen pregnancy in the United

States is significant, ongoing attempts in the prevention of teen pregnancy through public policy and initiatives is vitally important to improve the health of the nation. Currently thirty-nine states require some level of parental involvement in a minor's decision to have an abortion. In January 2000, Texas enacted a law requiring the medical provider to provide parental notification prior to performing an abortion on a minor. The law requires an abortion provider to notify at least one parent of the intent to terminate the pregnancy at least 48 hours prior to the abortion.

In 2005, an amendment of the law requires notarized parental consent in addition to notification for an unemancipated minor to receive an abortion. Parental *notification* is verbal communication from the abortion provider to the parent advising them of the planned procedure, while *parental consent* is written permission from the parent allowed the procedure to be performed.

This research investigated the effects of parental notification and consent laws on teen births and abortions in Texas. This study compared teenage births and abortions, as well as other health outcomes related to pregnancy in Texas. Reproductive health data for females aged 13 - 21 in Texas who gave birth or had an abortion was studied for the years 1995 through 2009. The data were analyzed for the years prior to the notification laws in Texas in 2000, the years after the enactment of the notification law, and after the most current data following the more rigid consent law of 2005.

Teenage Pregnancy and Birth

The teen pregnancy rate in the United States has declined from its highest point in 1990 of approximately 117 pregnancies per 1,000 females aged 15 - 19 years. Current data now estimate around 615,000 total or 57 per 1,000 females aged 15 - 19 years become pregnant each year (Guttmacher Institute, 2010).

With the reduction in the teen pregnancy rate, birth rates from teen pregnancies are also lower; 305,420 of these three-quarter million females gave birth in 2012, at a rate of 29.4 births per 1,000 females aged 15 - 19. Almost 90 percent of these births occur outside of marriage (CDC, National Center for Health Statistics, 2012). This shows a marked drop in the number of births to teens as 2012 was the lowest annual number ever reported. This is a reduction of six percent from the 2011 birth rate of 31.3 per 1,000 females aged 15 - 19. Births to teens have dropped steadily year after year from the highest rate of 61.8 per 1,000 females in 1991, with the exception of 2006 and 2007 where there were small increases (CDC, National Center for Health Statistics, 2012).

Race and Ethnicity

While the birth rate for teens has declined for all ages, races, and ethnic groups since 1991, there is large variation in the birth rates between pregnant white teens and pregnant minorities. In 2012, birth rates for Black teens was 43.9 births per 1,000 females aged 15 - 19, Hispanic teen birth rate was 46.3, while for white teens there were 20.5 births were per 1,000 females aged 15 - 19 (U.S. Department of Health & Human Services, 2013). In 2008, the pregnancy rate in white teens was 43.3 per 1,000,

representing a 50 percent decline since 1990. Additionally, the pregnancy rate among black teens in 2008 showed a reduction of 48 percent, but was still 117 pregnancies per 1,000 females. The Hispanic teen pregnancy rate in 2008 of 106.6 pregnancies per 1,000 females also reflects a decline of 37 percent from its highest rate of 169.7 in 1992 (Kost & Henshaw, 2012). These differences may have factors relating to socioeconomic concerns such as education and income, cultural characteristics and attitudes teenagers have about pregnancy and having children. Such viewpoints may affect the frequency in using contraception and sexual intercourse (Abma, Martinez, & Copen, 2010).

Across all races, the year with the lowest teen pregnancy rate was 2008 with 67.8 pregnancies per 1,000 females aged 15 - 19 contrasted with the highest rate in 1990 at 116.8 pregnancies (Kost & Henshaw, 2012). The rate of pregnancy for those teenagers who became pregnant the first time having intercourse was 152.8 pregnancies per 1,000 females aged 15 - 19, suggesting the overall teenage pregnancy rate is heavily weighted by a large number of persons that had not yet had sexual intercourse (Abma, Martinez, & Copen, 2010). This highlights the need for better access to sex education in order to prevent unintended pregnancies.

Of importance to the decline of teenage pregnancy and teenage births is acknowledging increasing condom use, the use of injectable or implantable contraceptive devices, as well as "the leveling off of teen sexual activity" (CDC, 2001) as possible factors influencing declines in pregnancy rates. An additional area of interest is the data showing the downward trending of teenage pregnancy until the years of 2006 and 2007, which showed a 5 percent increase in the birth rate for teens aged 15 - 19

years, although 2009 resumed the pattern of decline (Abma, Martinez, & Copen, 2010). Researchers have not identified a specific reason for this increase, but are looking at a change in cultural acceptance of teen pregnancy due to some recent high profile teen pregnancies as well as the fact that older teens are choosing to give birth, and they represent three-fourths of the teen pregnancy population studied (NCHS, 2008).

Teenage Pregnancy as a Health Problem

Medical risks for pregnant teens are higher than for older women (Ventura, Mathews, & Hamilton, 2001). Pregnant teens are more likely to be unmarried, have lower socioeconomic status, be less educated, and exhibit high-risk behaviors (Guttmacher, 2005). More than 80 percent of teen pregnancies are unintended and teenage pregnancy accounts for 20 percent of all unplanned pregnancies per year in the United States (Guttmacher, 2006).

The public health concern for teenagers and their pregnancies is highlighted by the higher potential for poor outcomes for the mothers and babies as the data show teens are less likely to seek prenatal care and engage in unhealthy behaviors such as drinking alcohol and smoking (Ventura, Mathews, & Hamilton, 2001). Poor outcomes include preterm delivery, defined as between 0 - 36 weeks gestation, late care seeking teens (acquiring prenatal care at 20 weeks gestation or later), low birth weight (0 - 2499 grams), as well as obtaining a second trimester abortion (between 12 and 28 weeks gestation).

Nearly one-third of all teen pregnancies result in abortion (Guttmacher, 2009). Abortion legislation and abortion laws concerning minors are different throughout the

United States. There are thirty-nine states that require some type of parental or guardian participation in the decision of a minor in obtaining an abortion. These range from notification of the intent of the abortion to notarized consent of both parents (Guttmacher, 2014).

Cost of Teenage Pregnancy

Poor pregnancy outcomes, as well as births to teens are high in cost, and society assumes many of these direct and indirect costs. Studies show the United States government spends almost 11 billion dollars annually for expenses directly related to unintended teenage pregnancy (Guttmacher, 2011). Research determined one million, or over two-thirds of the unintended births, in 2006 were publicly funded (Sonfield, Kost, Benson Gold, & Finer, 2011).

A direct cost comparison between abortion and births in 2006 show the average cost for an abortion at 10 weeks' gestation was $451 to terminate the pregnancy while the average Medicaid birth cost $11,647 for the delivery and related expenses. Estimated public funds for abortions in the United States in 2006 is 89 million dollars (Sonfield et al., 2011). Compared to the close to 11 billion dollars in expenses for unintended pregnancies, the variance is distinct. The differences in expenses represent a dramatic depiction of the vast economic concern teenage pregnancy presents.

Research suggests the direct cost to society of 11 billion dollars is actually double this amount for the pregnancy care, birth, and first year medical care for the infant (Hoffman, 2006). Larger and more expansive indirect expenses include costs for the health care of the mother and baby as well as welfare, food stamps, foster care

services, and prison construction because children of teen parents are much more likely incarcerated than children born to adult parents (Allen, Philliber, Herrling, & Kuperminic, 1997).

Children Born to Teenagers

Children born to teenage mothers differ in later life from those children born to older women. These children on average earn a lower income and therefore pay fewer taxes than do children born to adult women (Hoffman, 2006). The earning potential of a person is often positively associated with their level of education achieved. Children of teenage mothers are more likely to drop out of high school, resulting in a decreased ability to obtain a job and earn money (Katz & Autor, 1999). Of the teen mothers without a high school diploma, 78 percent of their children live in poverty. Only nine percent of children with mothers that gave birth as adults, got married, and obtained a high school diploma live in poverty (Annie E. Casey Foundation, 2007). Children born to teenage mothers are approximately 33 percent more likely to have a teenage birth themselves, thus perpetuating the cycle (CDC, 2011). Society spends a large proportion of the dollars required to support teenage mothers. Almost 80 percent receive some type of public benefits such as housing or food stamps (Hoffman, 2006) and only 30 percent received child support in 2001 (Annie E. Casey Foundation, 2007).

In Texas, the costs to the taxpayer related to children born to teen mothers in 2008 can be broken down in several categories. Public health care programs account for 221 million dollars. These include Medicaid and CHIP (Children's Health Insurance Program). Child welfare services cost 111 million dollars in Texas and 175 million

dollars were associated with increased rates of incarceration. Additionally, it is estimated that 378 million dollars is lost in tax revenue related to decreased earnings and the ability to spend more by the children born to teen mothers (TheNationalCampaign.org, 2001).

International Comparison

Though the evidence of a declining rate of teenage births is heartening, the United States still has the highest teen birth rate in the industrialized world at 40.2 births per 1,000 females aged 15 - 19 years. Great Britain is second with 24 births per 1,000 females and Switzerland is the lowest at four births per 1,000 females aged 15 - 19 years (National Center for Health Statistics, 2010).

Teenagers in the United States are more likely to have a child before the age of 20 than those in Great Britain, Canada, France, or Sweden (Singh & Darroch, 2001). For a nation that is a leader in most measures of development and industry, the United States is markedly behind in the provision of reproductive services and educational programs to teenagers. In these countries with lower teen pregnancy and birth rates, the emphasis is on comprehensive sex education rather than on the promotion of abstinence. The focus on education in these countries is on the prevention of pregnancy, preventative measures for HIV or other STIs (Sexually Transmitted Infections), and contraception usage, access, and information. In England, Wales, France, and Sweden, sex education is mandatory in the public schools and is available in most schools in Canada (Darroch, Frost, & Singh, 2001).

Teenagers in the United States have higher pregnancy, birth, and abortion rates than other developed countries (Guttmacher, 2001). In comparing teens' sexual behaviors in other countries, teenagers in the United States initiate sex at about the same age and have sex about as often as teens in countries other than the United States. Distinct differences are in contraceptive use. Sexually active teens in the United States are less likely to use contraceptives, have shorter sexual relationships, and have more sexual partners compared to other industrialized nations (Guttmacher, 2001). In other developed countries, adults deliver more focused messages to teens that convey that a sexual relationship is a serious undertaking and should only happen in a committed relationship (Darroch, Singh, & Frost, 2001). Generally, the other developed countries such as Canada, France Great Britain, and Sweden have a more open perspective to sexuality (Boonstra, 2000), exhibited by the teenager's increased access to reproductive health services and well established comprehensive sex education in schools and public settings (Darroch, Singh, & Frost, 2001).

Abortion in Teenagers

Of the teenage pregnancies in the United States, 82 percent are unplanned (Finer & Henshaw, 2006). The teen abortion rate in the United States in 2008 was 17.8 abortions per 1,000 females aged 15-19 years. The abortion rate was lower only in the years prior to the legalization of abortion in 1973 by *Roe* v. *Wade*, 410 U.S. 113 (1973) and is 59 percent lower than its peak in 1988 of 43.5 percent. Through the years 1986 and 2008, the proportion of teen pregnancies terminated by abortion declined by almost

one-third from 46 percent to 31 percent. Of the total abortions performed on females in the United States, teenagers comprise 18 percent (Jones, Finer, & Singh, 2010).

Abortion rates vary across racial and ethnic groups. The abortion rate among Black teenagers of 40.8 per 1,000 girls aged 15 - 19 in 2008 is almost three times the rate of 12.8 for non-Hispanic Whites. The rate among Hispanic teenagers of 20.1 is twice the rate for non-Hispanic White teenagers (Kost & Henshaw, 2012). These numbers are proportional to the pregnancy rate variations in race and ethnicity in teenagers.

Reproductive Health Care History

To adequately understand the progress made in the reproductive health care of adolescent females, a historical review is necessary. In the early 1900s in the United States, there was little education or information available to women concerning birth control. In fact, legislation passed in 1873, named the Comstock Act, prohibited the sending of any "obscene, lewd, and/or lascivious" materials through the mail (Eskridge, 2002). This included any contraceptive devices and related information. In addition to banning contraceptives, this act also banned the distribution of information on abortion for educational purposes. This made the education or training of birth control methods illegal, resulting in possible imprisonment or fines if found guilty (Comstock Act, 1873).

The Comstock Act reads,

> "Be it enacted... That whoever, within the District of Columbia or any of the Territories of the United States...shall sell...or shall offer to sell, or to lend, or to give away, or in any manner to

> exhibit, or shall otherwise publish or offer to publish in any manner, or shall have in his possession, for any such purpose or purposes, an obscene book, pamphlet, paper, writing, advertisement, circular, print, picture, drawing or other representation, figure, or image on or of paper or other material, or any cast instrument, or other article of an immoral nature, or any drug or medicine, or any article whatever, for the prevention of conception, or for causing unlawful abortion, or shall advertise the same for sale, or shall write or print, or cause to be written or printed, any card, circular, book, pamphlet, advertisement, or notice of any kind, stating when, where, how, or of whom, or by what means, any of the articles in this section…can be purchased or obtained, or shall manufacture, draw, or print, or in any wise make any of such articles, shall be deemed guilty of a misdemeanor, and on conviction thereof in any court of the United States...he shall be imprisoned at <u>hard labor</u> in the <u>penitentiary</u> for not less than six months nor more than five years for each offense, or fined not less than one hundred dollars nor more than two thousand dollars, with costs of court" (Comstock Act of March 3, 1873, c. 258, 17 Stat. 598).

Such restrictions on contraception concerned a public health nurse, Margaret Sanger. In 1912, she began to distribute information about birth control and assisted

women in accessing contraceptives. She challenged the legality of such prohibitions in 1916, citing the adverse health effects of poorly spaced childbirth, miscarriages, and abortion by opening the first family planning clinic in New York (National Women's History Museum).

In 1900, one in five children died during the first five years of life and six to nine of every 1,000 women died in childbirth (CDC, 2000). Through Margaret Sanger's diligent work in the 1920s and 1930s, physicians were legally able to prescribe birth control methods and counsel their patients in contraception. Furthering women's rights significantly, the Nineteenth Amendment in August of 1920, gave them the right to vote (U.S. Cont. amend. XIX). Additionally, the 1930s saw some state health departments and public hospitals begin to initiate family planning services for patients (Gordon, 1975).

Family planning during the early 1900s specifically focused on married couples and their limiting family size and child spacing. By 1933, the average family size had declined from 3.5 in 1900 to 2.3 children (CDC, 2000). During 1939 - 1948, maternal mortality decreased by 71 percent (Children's Bureau, Social Security Administration, 1950) and through 1949, infant mortality rates declined 52 percent (Public Health Service, 1954).

Attributing much of the decline in maternal and infant mortalities is birth control as well as improved information for prenatal health, drastically improved sanitation efforts, use of antibiotics, and better nutrition (Meckel, 1990). The decreasing marriage rate since the 1950's is also attributed in part to increased access to and information

about contraception (Stevenson & Wolfers, 2007), suggesting that women could put off starting a family, but be sexually active without the fear of becoming pregnant while unmarried.

The 1960's began an era of modern contraception with the advent of the birth control pill and the IUD (intrauterine device). The FDA approved the production and use of the birth control pill in 1960 and by 1967 over 12.5 million women worldwide were on the pill (Guttmacher, 2004). Although approved as the as the first oral contraceptive in 1960 for women, contraceptives were not made available to married women throughout the United States until the case of *Griswold v. Connecticut*. In 1965, the court held that the Connecticut statute deeming the use of contraceptives a criminal offense was unconstitutional (*Griswold v. Connecticut*, 381 U.S. 479 1965).

Additionally, the birth control pill was not available to unmarried women in all states until *Eisenstadt v. Baird* in 1972. The court held the state of Massachusetts' statute determining it unlawful for unmarried persons to have access to contraception was unconstitutional and in violation of the Equal Protection Clause (*Eisenstadt v. Baird*, 405 U.S. 438 1972). Currently, there are over 100 million women taking a type of birth control pill globally, with almost 12 million women taking it in the United States (Trussel, 2007). However, access to such contraception for teens is not as easy.

Sexually Active Adolescents

Sexual activity in adolescents and the resulting outcomes such as sexually transmitted infections (STIs), pregnancy, abortion, and babies born to teens are a public health concern. According to the Vital and Health Statistics report of 2002, 46 percent of all 15 - 19 year olds in the United States have had intercourse least once (Abma, Martinez, Mosher, & Dawson 2004).

Sexual activity among teens is occurring later in their adolescent years, however these same individuals are waiting longer to marry, thus possibly exposing themselves to unintended pregnancy and sexually transmitted infections (Guttmacher, 2002). The use of contraceptives among this group is increasing annually. Attributing to the increase is the availability of more effective contraception and increased education (Abma, 2004).

Contraception is available in many forms, and listed in effectiveness from greatest to least includes: the intrauterine device (IUD), devices inserted in the arm by a medical professional that releases hormones to prevent pregnancy, birth control pill, injectable contraception, diaphragm, male and female condoms, and the withdrawal method. Their effectiveness ranges from greater than 99 percent effective to 70 percent effective (Planned Parenthood, 2010). This is not a complete list of available contraception, but does note those most frequently used by adolescents.

Sex Education

Sex education programs have been often been the subject of debate. The questions related to teaching a child about the physical aspects of sexual intercourse, the use of contraception to prevent pregnancy and sexually transmitted infections (STIs) vs.

abstinence only education is a contentious subject. There are two general concepts of sex education in United States public schools. These are abstinence only and comprehensive programs. The abstinence only education teaches adolescents not to be sexually active until they get married and does not provide information about contraception, pregnancy, or STIs. The comprehensive sexual education programs are often described as "balanced" information and usually discuss abstinence as the preferred choice for teens, but also instruct the adolescents about contraceptive use and protection from unintended pregnancy and STIs (Kirby, 2002).

Public schools began the development of educational programs in the 1970's with the intent to investigate adolescent sexual behavior. The awareness of HIV/AIDS in the late 1980's has increased the attention to such programs and furthered the coordination and provision of sex education programs to adolescents (Kirby, Short, Collins, Rugg, Kolbe, Howard, Miller, Sonenstein, & Zabin, 1994). The fact that most people experience puberty at around 13 or 14 years of age, then have sexual intercourse generally around age 17, but do not get married until their mid to late 20s suggests that the timeframe for the highest risk for unintended pregnancy and STIs is lengthy (Guttmacher, 2003).

A teen may obtain information and education about reproductive health care services from many locations. The sources can be informal such as parents, peers, or relatives or they may be formal, highly organized groups that are in existence to further their specific mission. These well-developed organizations and their goals may vary

greatly in terms of their message and purpose, but many are similar in the way they conduct their operations.

Two examples of such official groups are Planned Parenthood and Focus on the Family. Planned Parenthood's website states,

> "Whether talking with members of Congress, parents, or faith leaders, or arguing cases before the U.S. Supreme Court, we fight for commonsense policies that promote women's health, allow individuals to prevent unintended pregnancies through access to affordable contraception, and protect the health of young people by providing them with comprehensive sex education" (Planned Parenthood, 2010).

Focus on the Family, in contrast, has in their website the following statement,

> "While it might seem old-fashioned or passé to people outside the faith, the Christian view of sexuality is actually a very radical one. It's radical because it goes against the culture and holds up human sexuality as nothing less than an icon of the inner life of God" (Stanton, 2004).

Although their messages are different, some of their goals are similar. Their need to support their services through asset building and resource management is the same as in any organization. Funding and support is vital to continue outreach missions, regardless of their ideology and beliefs.

In *Emerging Answers*, conducted by the National Campaign to Prevent Teen Pregnancy, the researchers divided sexual education programs into three types: those that focus on sexual antecedents, those focused on non-sexual antecedents, and both (Kirby, 2007). Offered in public schools, those in the sexual antecedent category include abstinence only programs, sex, and HIV programs. Programs provided in the community setting are family planning, such as reproductive care or contraceptive provision. The programs that are considered non-sexual antecedents are generally early childhood programs, youth development programs, and vocational or employment programs. The comprehensive program includes variations of the aforementioned components. (Kirby, 2007).

Currently, 35 states have legal mandates established at a local level, but the actual content of sex education or education on HIV/AIDs and other STI programs allows for broad interpretation (Gold & Nash, 2001). A recent trend is occurring in 15 states that require sex education programs to be medically accurate and 27 states require the education be age appropriate (Guttmacher, 2010). Adolescents in the United States need guidance and education to make informed choices for their future.

Formally introduced in the early 1980's, abstinence education has been a controversial issue. Proponents suggest its lack of convincing success is due to media influence and increased cultural promiscuity. Such advocates propose that increased governmental funding would offset these deterrents. However, since 1996 the government has spent more than one billion dollars on abstinence-only education. Critics of such programs cite ethical and evidence-based concerns regarding information

relating only to abstinence education. According to the American Academy of Pediatrics, "Children and adolescents need accurate and comprehensive education about sexuality to practice healthy sexual behavior as adults. They suggest that "abstinence-only programs have not demonstrated successful outcomes with regard to delayed initiation of sexual activity or use of safer sex practices" (AAP, 2001).

In 2008, more than quarter of the states in the U.S. declined receipt of millions of dollars in federal funds for abstinence-only programs due to concern over their lack of impact on teen pregnancy (Furrow, Greaney, Johnson, Jost, & Schwartz, 2008). In 2007, New York State formally rejected federal grants, with the state's health commissioner, Dr. Richard F. Daines stating, "The Bush administration's abstinence-only program is an example of a failed national healthcare policy directive." Dr. Daines also added that the Bush policy was "based on ideology rather than on sound scientific-based evidence that must be the cornerstone of good public healthcare policy" (New York Times, September 21, 2007).

Most health service researchers suggest that modified sex education programs that encourage abstinence as the best option for STI and pregnancy prevention, coupled with development of communication skills to foster power over one's body and other practical techniques are amongst the most successful in delaying sexual activity. The increased use of birth control in adolescents also plays a primary role (Landry, 1999). The combination of abstinence, life skills communication, and birth control methods offer choices for the adolescent in their decisions regarding sexual behaviors. Research shows that there is little scientific evidence that abstinence only programs delay sexual

activity or reduce teen pregnancy. Additionally, research is showing that the education of contraceptive use does not increase sexual activity in teens (Kirby, 2007). "Emphasizing both abstinence and protection for those who do have sex is a realistic, effective approach that does not appear to confuse young people" (Kirby, 2007).

The Obama administration has established the Office of Adolescent Health, whose charge is to support and expand teen pregnancy prevention programs as well as other adolescent health concerns such as mental health, violence, substance use, physical activity, nutrition, and tobacco use. To obtain funding, programs with the premise of prevention are more frequently asked to evaluate their effectiveness. There are some opportunities for these programs to prove their effectiveness while evaluating their ability to effect change. Oftentimes collaboration between public and community programs occurs in the evaluation process. Cooperation between such units may offer more opportunity in the realm of funding for their services (Flurhr, Oman, Allen, Lanphier, McLeroy, 2004). The Obama administration has increased its funding by 19 million dollars to a total of almost 135 million dollars (Guttmacher, 2010). This program is constructed as a competitive grant program allowing funding to organizations or groups that are able to replicate educational programs "proven effective through rigorous evaluation to reduce teenage pregnancy, behavioral risk factors underlying teenage pregnancy, or other associated risk factors" (Office of Adolescent Health, 2010).

Much evidence points to the effectiveness of comprehensive sexual education programs. "Two-thirds of the 48 comprehensive programs that supported both abstinence and the use of condoms and contraceptives for sexually active teens had

positive behavioral effects" (Kirby, 2007). The primary requirements this grant program has are the program's ability to show effectiveness in reducing teen pregnancy and births and STIs are that they are age appropriate, scientifically and medically accurate and emphasize the preference for abstinence (Guttmacher, 2010).

Legal Concerns Related to Pregnancy and Abortion

The legal concerns associated with teenage pregnancy and teen abortions are both a private family matter as well as an issue that affects society as a whole. The federal and state laws restricting access to health care services for reproductive health may be detrimental to the adolescent as well as to his or her community. Legal counsel for the Center for Adolescent Health Care and the Law states, "Confidentiality is implicit in maintaining a patient's privacy, but confidentiality between provider and client is not an absolute right. Privacy is defined as the ability of the individual to maintain information in a protected way. Confidentiality in health care is the obligation of the health care provider not to disclose information" (English, 2001). The difficulty therein lies with respecting a minor's right to privacy and the parent's right to determine appropriate care for their child.

Federal Law

In the seminal case of *Roe* v. *Wade*, 410 U.S. 113 (1973), the United States Supreme Court held that a Texas law that criminalized all abortions, except those cases to save the mother's life, violated the Fourteenth Amendment, which is an individual's constitutional right to privacy, extending this right, somewhat to adolescents and their access to reproductive services. The issue becomes clouded in the area of parental and a

minor's rights in consenting to care, as well as in the aspect of confidentiality about the type of care provided. It is generally accepted that minors cannot consent to most types of health care, with the following exceptions: in the case of the mature minor, the emancipated minor, and in an emergency situation (American Academy of Pediatrics, 1995). The mature minor is determined by a court to be mentally and emotionally capable to consent to medical care. In the case of the emancipated minor, the adolescent is generally at least 16 years old, living separate from the parents, and is financially independent. Additional categories of the emancipated minor include a married minor, one serving in the military, or is a parent or and/or currently pregnant (Wallach, 1999).

The majority of the states permit minors aged 13 through 18 to provide consent for select health care testing and treatment, including contraception, sexually transmitted diseases, pregnancy, alcohol and drug abuse, and psychiatric problems, but the laws vary by state (Broome & Stieglitz, 1992). In most of these instances, the provider is not obligated to obtain consent from the parent or guardian, nor are they required to notify the parent of the care received.

Title X of the Public Service Act established a system of health care clinics across the states to provide family planning services. Over time, the language of Title X has expanded to include policies in relation to the provision of contraceptive services for teens. Effectively, the law required Title X facilities to "encourage" minors to discuss family planning services with their parents, resulting in an interpretation by the Reagan administration that the facilities must notify parents within ten days of prescribing

contraception to a minor. In *Planned Parenthood v. Matheson,* 1983, the court held this mandate to be unconstitutional due to privacy protections.

Found in *Griswold v. Connecticut*, 381 U.S. 479 (1965) is legal precedence in the provision of contraception to minors without parental consent. The court held that the Connecticut statue deeming the use of contraceptives a criminal offense was unconstitutional. Other case law is found in *Eisenstadt v. Baird*, 405 U.S. 438 (1972), in which the state of Massachusetts' statute determining it unlawful for unmarried persons to have access to contraception was found unconstitutional and in violation of the Equal Protection Clause. In 1977, *Carey v. Population Services International*, 431 U.S. 678, the Supreme Court held that the Fourteenth Amendment extended to the rights of privacy for minors. The court stated that minors had the right "whether to bear or beget a child", thus making it unconstitutional to criminalize the distribution of nonprescriptive contraceptives to minors (*Carey v. Population Services International*, 431 U.S. 678). Additionally, concerning a minor's abortion, the Supreme Court upheld a parental consent law, with a judicial bypass provision, in 1983 in *Planned Parenthood v Ashcroft*, 462 U.S. allowing a minor to consent to abortion without parental notification, with a judge's ruling.

State Laws

At the state level, legislators in 39 states enacted 141 new requirements relating to reproductive health in the 2013 (Guttmacher, 2014). Seventy of these provisions in 22 states restrict or hinder access to abortion services. Across the states, increased waiting periods and additional counseling requirements were legally instituted as well as

gestational bans outlawing abortions at or after 20 weeks' gestation. The provisions of such abortions are only in situations if the mother's life is in danger.

Also enacted were strict insurance coverage restrictions in several states relating to abortion in advance of health care reform and health information exchanges (HIEs). Introduced and enacted in six states are new reviews of medication abortion. These account for 17 percent of abortions provided in non-hospital facilities (Guttmacher, 2011). They specifically require medical providers to use a protocol approved by the Federal Drug Administration in 2000, but has since been updated to provide an improved procedure for the patient that allows the patient to take a lower first dose of the medication and provides for the second dose to be taken at home. Lastly, a number of states have banned the use of telemedicine for medication abortions whereby the patient may receive counseling through a videoconference process. Such use of teleconference technology has been increasing in popularity in underserved and rural communities (Guttmacher, 2011).

The rates of teen pregnancy and abortion vary considerably among states (Ventura, Mathews, & Hamilton, 2001). Abortion legislation and abortion laws concerning minors also differ across state lines. Thirty-nine states require some level of parental involvement in a minor's abortion. Twenty-one states require parental consent, of which three require both parents' consent (Kansas, Mississippi, and North Dakota). Thirteen states require parental notification, with Minnesota requiring notification of both parents. Five states require both parental consent and notification and eight states require the parental documentation of authorization to be notarized (Guttmacher, 2014).

Thirty-eight states do provide alternative judicial procedures for minors seeking an abortion through the courts and 36of these states permit a minors' abortion in the case of a medical emergency. Only 16 states allow an abortion for a minor in situations of abuse, neglect, incest, or assault (Guttmacher, 2014). Parental notification and consent laws and their effect upon teenage pregnancy and related outcomes are important in the study of teenage pregnancy outcomes and the rate of teen abortions. In states with parental notification and or consent laws, pregnancy and abortion rates may be lower than actual due to the minor traveling to a neighboring state for an abortion.

State Trends in Pregnancy, Births, and Abortion

From 2007 to 2012, teenage pregnancy rates declined in every state in the United States. In 2005, states with the largest number of teenagers reported the highest number of teen pregnancies. The most populous state, California, reported the highest number of teenage pregnancies at 96,490. In 2005, there were 1,289,638 persons aged 15 - 19 years living in California. This gross number of teenage pregnancies is followed by Texas, New York, Florida, and Illinois with about 70,000 - 30,000 teenage pregnancies reported in 2005. Tracking the population numbers, the smallest numbers of teenage pregnancies were in Vermont, North Dakota, Wyoming, South Dakota, and New Hampshire, all reporting fewer than 1,600 pregnancies among women aged 15 - 19 and residing in the bottom quartile of the least populated states (U.S Census Bureau, 2007).

As reported in 2005, the highest teenage pregnancy rate (93 per 1,000 females aged 15 - 19) was in New Mexico, followed by Nevada, Arizona, Texas and Mississippi. The lowest pregnancy rates were in New Hampshire (33), Vermont, Minnesota, and

North Dakota. In 2011, teen birth rates were highest in Arkansas at 51 per 1,000 females aged 15 - 19, followed by Mississippi at 50, New Mexico at 49, Oklahoma at 48 and Texas at 47 (*note birth rate rather than pregnancy rate*). The states with the lowest teenage birth rates in 2011 were New Hampshire at 14 per 1,000 and Massachusetts at 15 per 1,000 females aged 15 - 19.

Teen abortion rates were the highest in New York at 41 per 1,000 females aged 15 - 19, New Jersey with 36 per 1,000, Nevada at 28 per 1,000, Delaware having 27 per 1,000 and Connecticut with 26 per 1,000 females. In five states, 15 percent or fewer teenage pregnancies ended in abortion: Kentucky, Arkansas, South Dakota, Oklahoma and Utah. Abortion providers drastically underserve these states' counties. They range from 96 percent of the counties without a provider in Oklahoma to 98 percent underserved in Kentucky and South Dakota (Guttmacher, 2011).

These data are quite suggestive. It appears that the more socially or politically conservative the state combined with the presence of parental notification and consent laws, result in higher teen pregnancy rates, birth rates and lower abortion rates. For example, Texas, New Mexico, Mississippi, Arkansas, and Arizona were all ranked as more conservative than liberal in a 2010 Gallup Poll, with Mississippi ranking first (Gallup, 2011). They also all have stringent laws related to teen abortion and the limitation of sexual education programs.

Texas Laws

The data presented above are only suggestive of a relationship with social and political leanings and the existence of parental notification and consent laws. This

research uses Texas data to provide a solid, empirical statement about the effect of parental consent and notification legislation related to teen abortions, teen births, and poor clinical outcomes from pregnancy and birth, including the prevalence of second trimester abortions in 18 year olds. Specifically, this research compares teenage births, abortions and pregnancy outcomes in three separate timeframes.

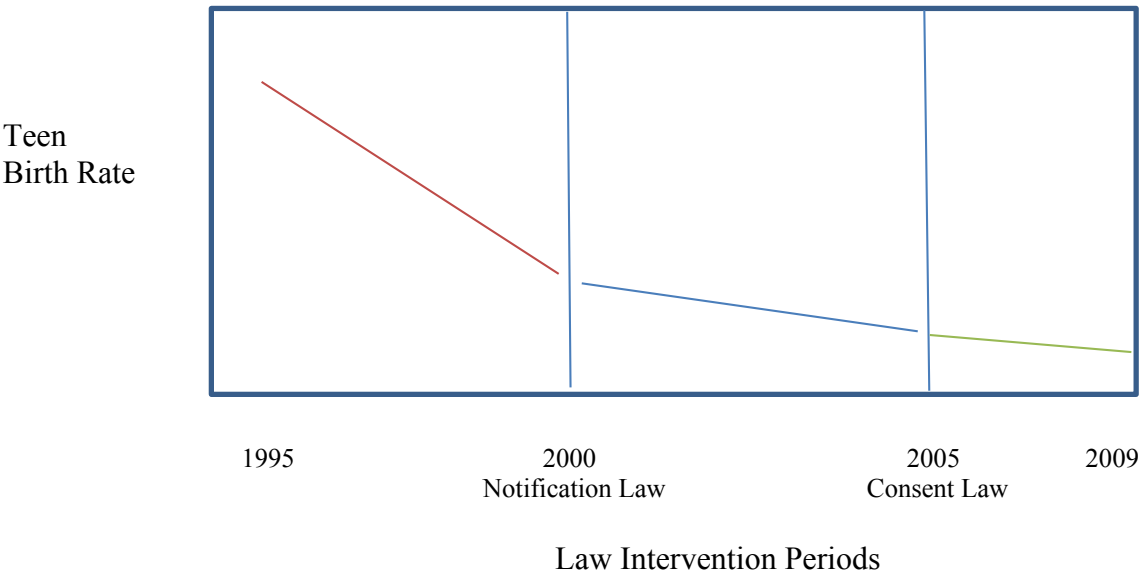
As of January 1, 2000, Texas began enforcing legislation that requires an abortion provider to notify within 48 hours, the parent of a minor child prior to performing the abortion procedure (Joyce, Kaestner, & Colman, 2006). The law is the Texas Parental Notification Act Family Code Chapter 33.002 adopted on May 25, 1999 by the 76th Legislature and enforced January 2000. The law does provide for judicial approval if the minor is "…mature and sufficiently well informed" when asking for judicial permission rather than parental notification to obtain an abortion. The requirement to be "well informed" states that the minor receive appropriate information from a health care provider about the health risks that are associated with an abortion procedure. She also must demonstrate an understanding of the alternatives to abortion and the potential emotional and psychological concerns affecting women obtaining abortion (Texas Family Code, Chapter 33). Texas only permits abortion in medical emergencies, not for situations of abuse, assault, incest, or neglect (Guttmacher, 2012).

In addition to attempting to establish the effect these laws have upon teen births, abortions, and poor pregnancy related outcomes, the incidence of second trimester abortions is investigated. Previous research has shown that the rate of second trimester abortions increase in teens just turning 18 years old as compared to teens becoming

pregnant at 18 years or older. They then obtain an abortion, as they will not be subject to parental consent laws as so they wait until they turn 18 years old to have an abortion (Joyce, Kaestner, & Colman, 2006). Second trimester abortions bring additional health concerns and emotional burdens (Guttmacher, 2009).

The legislative Act of May 27, 2005 by the 79th Texas legislature amended the Texas Occupations Code, effectually strengthening the requirements of abortion providers by requiring written notarized consent of the adolescent's parent, managing conservator, or legal guardian prior to performing an abortion on an unemancipated minor without a court order. This requires the Texas Medical Board to adopt and utilize specific paperwork required for abortion providers to obtain the written consent of either the parent or judge (Texas Family Code, Chapter 33). See Figure 1 for the hypothesized effect of legislation on births in Texas.

Figure 1. Illustrative Potential Effect of Legislation on the Births in Texas



The teenage pregnancy rate for Texas in 2005 was 88 per 1,000 females aged 15 - 19 years. The teen abortion rate in Texas was 13 per 1,000 females. As previously discussed, in 2006 two-thirds of the unintended pregnancies to women were publicly funded. In Texas, unintended pregnancies cost 1.29 billion dollars annually (Sonfield, 2011). These are the costs directly attributed to teen pregnancy. Considered to be higher are the indirect social and economic costs.

In 2013, at the second special session of the eighty-third legislature, Texas enacted House Bill 2 that is considered one of the most restrictive of abortion laws in the country. The measure restricts abortions after twenty weeks' gestation, mandates that abortion clinics meet the same standards required of hospitals or surgical centers, and dictates that a physician must have admitting privileges at a hospital within thirty miles of the facility where the abortion is performed (Texas Legislature, HB 2, 2013). Currently, there are only five abortion clinics residing in Austin, San Antonio, Dallas, and Houston that meet these standards, thus restricting access for all females in the state.

In 2000, the American College of Obstetricians and Gynecologists issued a policy statement relating to access to reproductive health care for adolescents. The statement reads, "The potential health risks to adolescents if they are unable to obtain reproductive health services are so compelling that legal barriers and deference to parental involvement should not stand in the way of needed health care for patients who request confidentiality. Therefore, laws and regulations that are unduly restrictive of adolescents' confidential access to reproductive health care should be revised" (ACOG, 2000). In consideration of establishing policy, this weighty statement should be

considered in policy decision making for minors access to reproductive health care services.

The legal barriers to a minor's abortion bring attention to an associated legal issue of a minor's rights and parental rights. Public policy, in its debate over confidentiality in a teen's access to reproductive health services, sees the most controversy in a teen's ability to obtain an abortion. Traditionally and legally, parents have the authority to determine the most appropriate medical care on the behalf of their minor children. In the instance of pregnancy, however, research can play an important role by providing information to assist policy-makers in their decisions concerning what is medically sound.

Access, privacy, and confidentiality are critical components in the reduction of sexually transmitted infections, teen pregnancy and abortions, as well as in the education of adolescents in sexual and reproductive health. When establishing policy and passing laws, decision makers must recognize the costs to society as well as the importance of the rights of minors in obtaining medical care for the sole purpose of a healthy and informed individual, regardless of age.

Previous Research on Notification Laws

Previous research in various states show interesting results related to laws involving minors and pregnancy. In 1991, the impact of the Minnesota Parental Notification Law on births and abortions was investigated. The study compared the time period before the law was enacted and after the law was enacted. The results showed a greater decline in minors 17 years and younger than for 18 - 19 year old females.

Additionally, there was no impact on the birth rate for the minor females. The researchers concluded the parental notification law reduced minor abortions, with birth rates trending downward, thus the law had an effect resulting in less minor pregnancies (Rogers, Boruch, & DeMoya, 1991).

Another study investigated state level data for differences in the abortion and pregnancy rate pre and post parental involvement laws on a national level for minors aged 15 - 17, older teens aged 18 - 19, and adults aged 20 - 44 years. The study determined that parental abortion laws reduce abortion rates by approximately 18 percent and pregnancy rates by eight percent in minors as compared to adult females (Ohsfeldt & Gohmann, 1994).

A study between laws in Mississippi and South Carolina compared the differences, if any, in Mississippi's 24 hour waiting period for abortion and South Carolina's one hour waiting period for minors and their obtaining an abortion out of state. The researchers also investigated if there were any distinct differences in the number of abortions to minors related to Mississippi's requirement for two parents to consent to the abortion and South Carolina's one parent mandate and seeking an abortion across state lines. They concluded that both the more stringent 24 hour waiting period as well as the two parent consent requirement were associated with an increase in minors who leave the state to obtain an abortion. South Carolina showed no significant effect related to its waiting period or one parent consent law (Joyce & Kaestner, 2001).

In Texas, abortions and births to teens in relation to parental notification laws were analyzed in 2006. The researchers assessed the rate changes in births and abortions

in minors aged 15 - 17 prior to the notification law in Texas, years 1998 and 1999, and after the law was enforced, years 2000 - 2002. The results showed a decrease in abortion rates in females aged 15 - 17 years and increased second trimester abortions in females aged 17.50 and 17.74 at the time of conception. The latter result shows a relationship between the parental notification law and second trimester abortions in 18 year olds as they become pregnant mid or late into their 17th year, then wait to have the abortion as they will no longer be a minor and can consent at the age of 18 (Joyce, Kaestner, & Colman, 2006).

Hypotheses

The hypotheses explored in this research study are:

Hypothesis 1: Parental notification and consent laws increase birth rates to minors and decrease abortion rates for females under 18 in Texas with the largest effect occurring after implementation of the notification laws.

Hypothesis 2: Parental notification and consent laws increase late care seeker (28 weeks gestation - none) rate and are predictors of the establishment of early or late prenatal care for females under 18 in Texas with the largest effect occurring after implementation of the notification laws.

Hypothesis 3: Parental notification and consent laws increase the incidence of "poor health outcomes" defined as low birth weight (0 - 2499 grams) birth rate and preterm delivery (0 - 36 weeks' gestation) birth rate for females under 18 in Texas with the largest effect occurring after implementation of the notification laws.

Hypothesis 4: Parental notification and consent laws increase second trimester abortion rate in 18 year old females in Texas with the largest effect occurring after implementation of the notification laws.

CHAPTER II

METHODS

Data

The overarching research question explored in this study was: *What effect did parental notification and consent laws have on the births, abortions, and birth outcomes for minors in Texas?* This research used publicly available data from the Texas Department of State Health Services Center for Health Statistics (http://www.dshs.state.tx.us/chs/) to address these issues.

The data included information on females aged 13 – 21 who gave birth or had an abortion between 1995 – 2009 in Texas and were included in the health care tracking systems of the Texas state department of health. This research focused on data from 1995 – 2009 as the time period of 1995 – 1999 was the four-year period prior to the enactment of the initial parental notification law in Texas; in 2000 – 2004, Texas implemented parental notification laws; in 2005 Texas laws changed to also require parental consent.

Although the ideal level of analysis would be the individual level, obtaining individual level birth certificates and abortion data for minors is extraordinarily difficult. Therefore, the data are at an aggregate level from the Texas State Health Department to permit the analysis of the data. The monthly rates across the years of interest for each age by race/ethnicity combination are the dependent variables. For each dependent variable, rate is defined as the rate per 1,000 females within a respective Age and Race/Ethnicity category.

Measurement

The dependent variables are monthly rates of events or risk factors related to teenage reproductive health measured from 1995 thru 2009. These appear below:

- Birth rate,
- Abortion rate,
- Birth outcomes
    - Late/no prenatal care (28 weeks or greater) birth rate,
    - Low birth weight (1 – 2499 grams) birth rate,
    - Preterm delivery birth rate (less than 37 weeks), and
- Second trimester (greater than 12 weeks) abortion rate.

Rates were calculated by dividing the monthly count total by the annual population count of the corresponding year for the respective age and race/ethnicity combination and multiplying that result by 1,000. Population totals for the various age and race/ethnicity categories are available on an annual basis so those totals are used for each of the twelve monthly data points in a given year.

$$\text{Rate} = \frac{\text{Dependent variable monthly count for age/race category}}{\text{Total annual population of females in age/race category}} \times 1{,}000$$

For each dependent variable except second trimester abortion, sub-group analyses were performed for age groups (13 – 15, 16 – 17, and 18 – 21) and race/ethnicity (Black, Hispanic, and white). The 18 – 21 age category was included as the comparison group. For second trimester abortion, the age categories explored were 17, 18, and 19 year olds. The 19-year-old category was included as the comparison group.

The independent variables were two indicator variables categorized as None (0) vs. Notification (1) Law Period (1995 – 1999 and 2000 – 2004) and Notification (0) versus Consent (1) Law Period (2000 – 2004 and 2005 – 2009). Refer to Tables 1 - 3 for average annual rates for the dependent variables by law period for the aggregated group of 13 – 21 year old females and further categorized by age and race/ethnicity. Average annual rates were calculated as follows:

$$\text{Rate} = \frac{\text{Average annual count per law time period for age/race category}}{\text{Average annual population of females per law time period in age/race category}} \times 1{,}000$$

Note that mean comparisons of these descriptive data were not conducted due to the time series nature of these data. Further explanation about the rationale behind using time series analyses are described below.

Table 1: Average Annual Rates per 1,000 Females 13 - 21 Years of Age for Birth, Abortion, and Birth Outcomes in Texas from 1995 – 2009

Dependent Variables	Law period 1 (None) 1995 - 1999	Law period 2 (Notification) 2000 - 2004	Law period 3 (Consent) 2005 - 2009
Birth	34.33	32.42	30.57
Abortion	8.46*	6.82	6.14
Late/no prenatal care	4.44	3.64	7.36
Low birth weight	2.86	2.80	2.80
Preterm delivery	3.57	3.68	4.29
Second trimester abortion**	0.05*	0.04	0.03

* = Data missing for 1995 and 1996

** = Only includes data for 17, 18, and 19 year old females

Table 2: Average Annual Rates per 1,000 Females by Age Category for Birth, Abortion, and Birth Outcomes in Texas for Females from 1995 – 2009

Dependent Variables by Age	Law period 1 (None) 1995-1999	Law period 2 (Notification) 2000-2004	Law period 3 (Consent) 2005-2009
Birth			
13 – 15	5.14	3.77	3.29
16 – 17	30.51	24.67	22.39
18 – 21	56.73	57.61	54.64
Abortion			
13 – 15	1.05*	0.76	0.65
16 – 17	6.47*	4.05	3.50
18 – 21	14.61*	12.72	11.49
Late/no prenatal care			
13 – 15	0.97	0.64	1.04
16 – 17	4.43	3.24	5.93
18 – 21	6.91	6.08	12.71
Low Birth Weight			
13 – 15	0.56	0.42	0.37
16 – 17	2.86	2.33	2.21
18 – 21	4.49	4.81	4.87
Preterm Delivery			
13 – 15	0.73	0.56	0.61
16 – 17	3.56	3.08	3.41
18 – 21	5.58	6.28	7.41
Second Trimester Abortion			
17	0.04*	0.03	0.02
18	0.06*	0.04	0.03
19	0.06*	0.05	0.03

* = Data missing for 1995 and 1996

Table 3: Average Annual Rates per 1,000 Females by Race/Ethnicity Category for Birth, Abortion, and Birth Outcomes in Texas for Females from 1995 – 2009

Dependent Variables by Race/Ethnicity	Law period 1 (None) 1995-1999	Law period 2 (Notification) 2000-2004	Law period 3 (Consent) 2005-2009
Birth			
Black	36.17	35.93	32.19
Hispanic	54.63	45.50	41.71
White	23.28	16.92	13.30
Abortion			
Black	13.41*	10.56	10.41
Hispanic	9.01*	6.70	5.43
White	8.04*	4.98	3.86
Late/no prenatal care			
Black	5.61	4.27	8.85
Hispanic	8.20	5.88	10.63
White	2.17	1.27	2.50
Low Birth Weight			
Black	5.42	4.97	4.62
Hispanic	4.07	3.50	3.44
White	1.74	1.32	1.11
Preterm Delivery			
Black	5.94	5.37	5.64
Hispanic	5.58	5.04	5.79
White	2.04	1.69	1.64
Second Trimester Abortion**			
Black	0.16*	0.12	0.10
Hispanic	0.01*	0.01	0.01
White	0.07*	0.05	0.03

* = Data missing for 1995 and 1996

** Only includes data for 17, 18, and 19 year olds

Time Series Model

Researchers sometimes use regression procedures to test for effects of "interventions." However, regression procedures assume independence among observations. When changes in one time period are correlated with changes at adjacent time periods ordinary least squares regression methods are inappropriate. In this case, time-series designs must be employed.

Time-series approaches track the outcome of a population over time and attempt to identify patterns of change in outcomes due to an intervention. Analysis of the time series includes a statistical comparison of the pre- and post- intervention time series segments. In general form the statistical model for a time series analysis is:

Y_t = intercept + b_{pre} + b_{post} + e_t

Where

e_t = an error term associated with Y_t.

The null hypothesis for this model, H_0: $b_{pre} - b_{post} = 0$, states that there is no statistically significant difference between the pre- and post-intervention series levels and that the intervention had no statistically significant impact on the series level (McDowall, McCleary, Meidinger, & Hay, 1980). In this study, the "intervention" is legislative changes in parental notification and consent laws and defines the before and after periods, where the before is viewed as the baseline period and the after is viewed as the treatment period to which the baseline is compared (Vasquez, Madden, & Walker, 2008).

The generic form for modeling time-series data is:

$Y_t = N_t + I_t$

where N_t denotes a "noise" component and I_t denotes an "intervention" component. The premise for this model is that the Y_t time series is composed of noise (or "errors") plus intervention (McDowall et al., 1980).

There are sources of variation, or noise, in a time-series that may mask intentional interruptions (i.e., the intervention) in the series: (a) trend: drift in the outcome variable (e.g., decreasing birth rates); (b) seasonality: fluctuations in the series associated with changes in season (e.g., birth rates may be higher in June than December), (c) random error: fluctuations in the data (i.e., random changes not due to the intervention, trend, or seasonality), and dependency among observations (McDowall et al., 1980).

Using time-series approaches, a statistical model can be developed that accounts for these types of noise. This model is used to determine whether the data following an intervention depart significantly from the model for data prior to the intervention. One model-fitting process, which accommodates correlated errors, is the Auto Regressive Integrated Moving Average (ARIMA) model. An ARIMA model that fits the data (i.e., accounts for the serial correlation of the errors (noise)) can be used to test for an interruption in the series due to an intervention.

Several assumptions must be met in order to use ARIMA modeling properly. The error terms must have a mean of zero and constant variance; the error terms must be independent; and the error terms must be normally distributed (McDowall et al., 1980).

The assumption that there is correlation within the observations is tested in the model development phase.

In general, an ARIMA model has three parameters which describe the relationship between the error terms and the time series. This "ARIMA (p,d,q)" model defines **p** as the number of autoregressive terms, or the number of past observations used to predict the current observation. The **d** parameter indicates that the time series was differenced to remove any general trend or drift. This amounts to subtracting the first observation of the series from the second observation, the second observation from the third, and so on. The **q** parameter is the number of preceding error terms to account for in the current observation (McDowall et al., 1980; Stadnytska, Braun, & Werner, 2008).

Identification refers to procedures for selecting the most appropriate values for p, d, and q for a given time series. In general, the researcher will have to know how many times to difference the data (d) and how many autoregressive and/or moving average parameters to estimate for a set of data (p and q). This forms the basis for the notation strategy used to identify what models one uses. For example, an ARIMA (1, 0, 1) model indicates that the errors are put through autoregression and moving average filters but not through a differencing filter (McDowall et al., 1980).

The first step in an ARIMA analysis is to specify the pre-intervention model. In this situation, the model is analyzed to determine whether parameters in the model differ significantly from zero. The model with the fewest number and least complex parameters is the model that should be adopted (Braden, Gonzalez, & Miller, 1990). The simplest model for any time series is to assume changes in the series are due entirely

to error. This model is specified as ARIMA (0,0,0) and is known as the random walk model (Nau, n.d.).

Assuming the intercept only model does not fit the data (i.e., the variations in the data are correlated) an alternative model is specified to test for white noise or variations that hide the effect of the intervention in the time-series data. The multivariate portmanteau (Q) test for white noise is performed (Box & Pierce, 1970; Ljung & Box, 1978). A stationary process has the same mean, variance, and autocorrelation function, ACF, (correlation coefficient estimated between the time series lag 0 and its k-th lag). If the ACF indicates the time series are nonstationary then they must be differenced (ARIMA (0, 1, 0)). Additionally, in practice, time series are almost always well represented by lower order ARIMA (p,d,q) models and the parameters p, d, and q will rarely exceed the first order (i.e., (1, 1, 1)).

Models where both p and q are nonzero are uncommon because of the relationships between autoregressive and moving average processes. Moving average processes are employed when there are visible spikes in the ACF. Autoregressive processes are indicated when there is a rough pattern of decline or increase in the ACF (McDowall et al., 1980). It is hypothesized that implementation of each restriction or law will create spike patterns in the ACF. In the initial analysis, no seasonality adjustment is considered [ARIMA (p, d, q) (P, D, Q) model], but research suggests that seasonality in birth data exists (Bronson, F. H., 1995; Lam, D.A. & Miron, J.A., 1991). Therefore, a nonseasonal first order model including differencing and the moving average was explored [ARIMA (0,1,1)], then the model was rerun using a twelve month

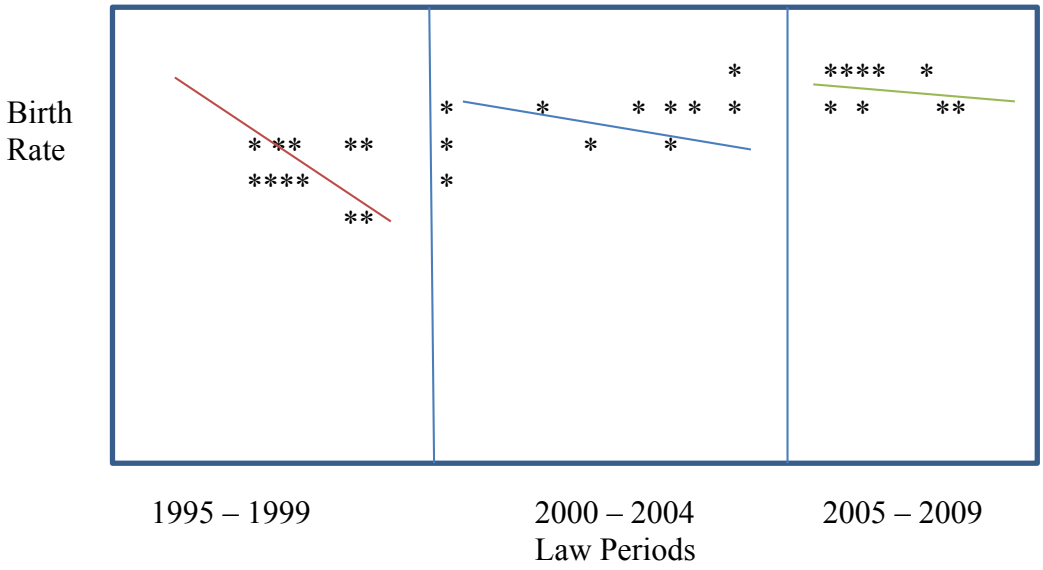
seasonal differencing period. These differences were calculated by subtracting the previous twelve month data from the current time period.

If significant autocorrelations are still present after adding a moving averages estimator for correlations between adjacent months, a new model is specified and tested until a model with adequate fit to the data is identified (Braden et al., 1990). Specifically, the p, d and q parameters will be adjusted until the correlation is removed and then looped through a range of reasonable values for each p and q. The model with the smallest Akaike's information criterion (AIC), an information criterion that indicates model fit, will be selected (Huber, C., 2011, personal communication). The AIC is able to best indicate the distance between the estimation of the data and the "true" model that generates the data. Minimizing the AIC reflects the model that best retains the data's information. The AIC is "an estimate of the information-loss distance for statistical models" (Giudice, M. D., 2009, p. 1).

In addition to modeling the pre-intervention time series and related noise, the researcher must also test the effect of the intervention: $Y_t = N_t + I_t$. Subtracting the noise effect from the time series the resulting model to test the intervention is: $I_t = Y_t - N_t$. Intervention effects may take one of three forms: (a) abrupt, permanent effects, (b) abrupt, temporary effects, or (c) gradual, permanent effects (McDowall et al., 1980). An abrupt, permanent effect is most likely for the impact of legislative changes on health outcomes and is the approach that will be used for this study. Changes in the level and slope for each time series period for each dependent variable will be explored. An indicator variable (0 = prior to the law, 1 = after the law) will be used in the model.

Separate ARIMA models will be applied for each age category (13 – 15, 16 – 17, and 18 - 21) and race/ethnicity category (Black, Hispanic, and White) to estimate any impact due to age or race/ethnicity. Figure 2 displays the potential effects of the intervention (changes in the law) on birth rates in Texas.

Figure 2. Potential Impact of Law period on Birth Rate in Texas



Data Analysis

The data set consisted of monthly rates for the dependent variables (births, abortions, births with no/late prenatal care, low birth weight births, preterm delivery births, and second trimester abortions) from 1995 – 2009 broken down by age groups (13 – 15, 16 – 17, 18 – 21) and race/ethnicity (combined, Black, Hispanic, white). Individual analyses were conducted on each age and race/ethnicity group combination for each dependent variable. For each dependent variable, the data were first formatted as time series data in Stata. Rate by time for each dependent variable were graphed to

visually inspect the time series nature of the data. Normality of the data was assessed using the Shapiro-Francia test for normality, Q-Q plots, and kernel density estimate. Non-normal data were transformed using a log transformation. A time series graph of the count for each dependent variable was then created.

To create the ARIMA model, the time series data were differenced and graphed (d = 1). If the resulting graph indicated that the differenced values varied around zero, i.e., the data were now stationary, the first order differencing was used in the model. If the graph did not indicate stationary data, a second order differencing was applied to the data (d = 2) and graphed.

To determine the value of the moving average (q) term to include in the ARIMA model a correlogram graph was created on the differenced data. The number of beginning points outside of the confidence band were visually counted and included in the model (e.g., 0, 1, 2, etc.). To determine the value of the autoregressive (p) term to include in the ARIMA model, a partial correlogram graph was created on the differenced data. The number of beginning points outside of the confidence band were visually counted and included in the model. These values were used to determine the starting ARIMA model (p, d, q).

The next step in the data analysis was to run the initial ARIMA model with no predictors. The coefficients, z-scores, and p-values for the autoregressive (p) and moving average (q) terms were reviewed to determine if any adjustments were needed in the ARIMA model. The modified ARIMA (if needed) was rerun until the p and q values included in the model were statistically significant. The AIC and BIC values were

analyzed in the initial and modified ARIMA models to check for model fit. The indicator variable law period none (0) vs. notification (1) was added as an independent variable in the ARIMA model to determine any effect of this predictor on the dependent variable. A second analysis was run adding the indicator variable for law period notification (0) vs. consent (1) to determine the effect, if any, on the dependent variable being explored.

To explore the effect of seasonality, the data were seasonally differenced using 12 months as the seasonal differencing factor. The analyses described above were rerun on the seasonally differenced data to determine the overall best fit ARIMA model and effect of the law period predictor variables.

CHAPTER III

RESULTS

Table 4 summarizes the ARIMA models for each dependent variable broken down by age and race/ethnicity group categories that had a significant notification law period predictor ($p < .05$). Table 5 summarizes the ARIMA models for each dependent variable broken down by age and race/ethnicity group categories that had a significant consent law period predictor ($p < .05$). Blank cells reflect ARIMA models that did not have a statistically significant law period predictor.

Table 4. Summary of ARIMA Models (p, d, q) for Dependent Variables by Age and Race/Ethnicity with Significant Findings for Notification Law Period

Dep. Var. Age/Race	Births	Abortions	Prenatal Care	Low Birth Weight	Preterm Delivery	Age / Race for 2nd Tri	Second Trimester Abortion
13 – 15			$(0,1,1)^S$			17	
13 – 15 Black					$(1,1,1)^S$	17 Black	
13 – 15 Hispanic	(0,1,1)		$(0,1,1)^S$			17 Hispanic	
13 – 15 White						17 White	
16 – 17		(1,1,1)		(1,1,1)	(0,1,1)	18	
16 – 17 Black	$(1,1,1)^S$	(0,1,1)	(0,1,1)		(0,1,1)	18 Black	
16 – 17 Hispanic	$(0,1,1)^S$	(0,1,1)	$(0,1,1)^S$	$(0,1,1)^S$	$(0,1,1)^S$	18 Hispanic	
16 – 17 White		(1,1,1)		(0,1,1)		18 White	

Table 4 Continued

Dep. Var. Age/Race	Births	Abortions	Prenatal Care	Low Birth Weight	Preterm Delivery	Age / Race for 2nd Tri	Second Trimester Abortion
18 – 21	$(0,1,1)^S$					19	
18 – 21 Black						19 Black	
18 – 21 Hispanic	$(0,1,1)^S$	(0,1,1)		$(0,1,1)^S$	(0,1,1)	19 Hispanic	
18 – 21 White	(1,1,1)	(0,1,1)		(0,1,1)	$(0,1,1)^S$	19 White	(1,1,1)

^{S} = None vs. Notification law period statistically significant predictor after controlling for seasonal differences

Table 5. Summary of ARIMA Models (p, d, q) for Dependent Variables by Age and Race/Ethnicity with Significant Findings for Consent Law Period

Dep. Var. Age/Race	Births	Abortions	Prenatal Care	Low Birth Weight	Preterm Delivery	Age / Race for 2nd Tri	Second Trimester Abortion
13 – 15		$(1,1,1)^S$	(0,1,1)		(0,1,1)	17	$(0,1,1)^S$
13 – 15 Black		$(1,1,0)^S$	(0,1,1)			17 Black	
13 – 15 Hispanic			$(0,1,1)^S$		(0,1,1)	17 Hispanic	
13 – 15 White			(0,1,1)			17 White	
16 – 17			$(0,1,1)^S$	$(0,1,1)^S$	(0,1,1)	18	$(1,1,1)^S$
16 – 17 Black			$(0,1,1)^S$			18 Black	
16 – 17 Hispanic			$(0,1,1)^S$		$(0,1,1)^S$	18 Hispanic	
16 – 17 White			$(0,1,1)^S$			18 White	
18 – 21		$(0,1,1)^S$	$(0,1,1)^S$			19	$(1,1,1)^S$
18 – 21 Black			(0,1,1)			19 Black	$(1,1,1)^S$
18 – 21 Hispanic			$(0,1,1)^S$			19 Hispanic	
18 – 21 White			(2,1,0)			19 White	$(0,1,1)^S$

S = Notification vs. Consent law period statistically significant predictor after controlling for seasonal differences

A majority of the statistically significant ARIMA models control for seasonal differencing. Research has shown seasonality effects in birth data (Bronson, F. H., 1995; Lam, D.A. & Miron, J.A., 1991) so it is not surprising to find the need to account for seasonal effects in birth rate data and other related outcomes. Additionally, the predominant ARIMA model for the various outcome variables was found to be (0,1,1), a first-order moving average model. This indicates that the ARIMA model generally contained no autoregressive term (the number of past observations used to predict the current observation), one differencing term (subtracting a given observation from its successive observation) and one moving average term (the number of preceding error terms to account for in the current observation). For example, this indicates that the prediction of the currently monthly birth rate value for 13 – 15 year old Hispanic females is the current monthly birth rate value plus an average of the current and previous error terms, essentially a correction for the error in the current month's birth rate value. Many nonstationary time series data are found to be fitted well by the ARIMA (0,1,1) model (Bloomfield, 2011).

A summary of the statistically significant results for each of the dependent variables are reported below as they pertain to the hypotheses being studied. Rate for the each of the dependent variables is the rate per 1,000 females within the respective Age and Race/Ethnicity category. Refer to Appendix A for an example of a complete set of output for one dependent variable.

Hypothesis 1: Parental notification and consent laws increase birth rates to minors and decrease abortion rates for females under 18 in Texas with the largest effect occurring after implementation of the notification laws.

Birth Rate

Table 6 presents a summary of the results for analyses related to birth rates. A description of these results is presented after the table. Only those results where $p < .05$ are noted.

Table 6. Summary of Significant Results for Birth Rate Changes During the Notification and Consent Law Periods

Age & Race/Ethnicity	Significant Impact on Birth Rate
13 – 15	
13 – 15 Black	
13 – 15 Hispanic	Birth rate decreased after notification laws were enacted
13 – 15 White	
16 – 17	
16 – 17 Black	Birth rate decreased after notification laws were enacted
16 – 17 Hispanic	Birth rate decreased after notification laws were enacted
16 – 17 White	
Comparison Groups	
18 – 21	Birth rate increased after notification laws were enacted
18 – 21 Black	
18 – 21 Hispanic	Birth rate increased after notification laws were enacted
18 – 21 White	Birth rate increased after notification laws were enacted

Ages 13 – 15, Hispanic

The results show that 13 - 15 year old Hispanic females had a **0.15 lower birth rate** per month after the notification laws were enacted (2000 – 2004) compared to the

no law period (1995 - 1999). The further demand for consent had no effect on the birth rate for this group.

Ages 16 – 17, Black

The results show that 16 - 17 year old Black females had a **0.33 lower birth rate** per month after the notification laws were enacted (2000 – 2004) compared to the no law period (1995 - 1999). The further demand for consent had no effect on the birth rate for this group.

Ages 16 – 17, Hispanic

The results show that 16 - 17 year old Hispanic females had a **0.75 lower birth rate** per month after the notification laws were enacted (2000 – 2004) compared to the no law period (1995 - 1999). The further demand for consent had no effect on the birth rate for this group.

Ages 18 – 21, Races Combined

The results show that 18 – 21 year old females had a **0.35 higher birth rate** per month after the notification laws were enacted (2000 – 2004) compared to the no law period (1995 - 1999). As adults, this group was unaffected by the notification or consent laws and are used as a comparison to females under 18.

Ages 18 – 21, Hispanic

The results show that 18 - 21 year old Hispanic females had a **1.36 lower birth rate** per month after the notification laws were enacted (2000 – 2004) compared to the no law period (1995 - 1999). As adults, this group was unaffected by the notification or consent laws and are used as a comparison to Hispanic females under 18.

Ages 18 – 21, White

The results show that 18 - 21 year old white females had a **0.66 higher birth rate** per month after the notification laws were enacted (2000 – 2004) compared to the no law period (1995 - 1999). As adults, this group was unaffected by the notification or consent laws and are used as a comparison to white females under 18.

Abortion Rate

Table 7 presents a summary of the results for analyses related to abortion rates. A description of these results is presented after the table. Only those results where $p < .05$ are noted.

Table 7. Summary of Significant Results for Abortion Rate Changes During the Notification and Consent Law Periods

Age & Race/Ethnicity	Abortion Rate
13 – 15	Abortion rate increased after consent laws were enacted
13 – 15 Black	Abortion rate increased after consent laws were enacted
13 – 15 Hispanic	
13 – 15 White	
16 – 17	Abortion rate decreased after notification laws were enacted
16 – 17 Black	Abortion rate decreased after notification laws were enacted
16 – 17 Hispanic	Abortion rate decreased after notification laws were enacted
16 – 17 White	Abortion rate decreased after notification laws were enacted
Comparison Groups	
18 – 21	Abortion rate increased after notification laws were enacted
18 – 21 Black	
18 – 21 Hispanic	Abortion rate decreased after notification laws were enacted
18 – 21 White	Abortion rate increased after notification laws were enacted

Ages 13 – 15, Races Combined

The results show that 13 - 15 year old females had a **0.01 higher abortion rate** per month after the consent law period (2005 – 2009) compared to the notification law period (2000 – 2004).

Ages 13 – 15, Black

The results show that 13-15 year old Black females had a **0.06 higher abortion rate** per month after the consent law period (2005 – 2009) compared to the notification law period (2000 – 2004).

Ages 16 – 17, Races Combined

The results show that 16 - 17 year old females had a **0.17 lower abortion rate** per month after the enactment of the notification law period (2000 – 2004) compared to the no law period (1995 - 1999). The further demand for consent had no effect on the abortion rate for this group.

Ages 16 – 17, Black

The results show that 16 - 17 year old Black females had a **0.16 lower abortion rate** per month after the notification laws were enacted (2000 – 2004) compared to the no law period (1995 - 1999). The further demand for consent had no effect on the abortion rate for this group.

Ages 16 – 17, Hispanic

The results show that 16 - 17 year old Hispanic females had a **0.26 lower abortion rate** per month after the notification laws were enacted (2000 – 2004)

compared to the no law period (1995 - 1999). The further demand for consent had no effect on the abortion rate for this group.

Ages 16 – 17, White

The results show that 16 - 17 year old white females had a **0.15 lower abortion rate** per month after the notification laws were enacted (2000 – 2004) compared to the No law period (1995 - 1999). The further demand for consent had no effect on the abortion rate for this group.

Ages 18 - 21, Races Combined

The results show that 18 - 21 year old females had a **0.12 higher abortion rate** per month after the consent laws were enacted (2005 – 2009) compared to the notification law period (2000 - 2004). As adults, this group was unaffected by the notification or consent laws and are used as a comparison to females under 18.

Ages 18 - 21, Hispanic

The results show that 18 - 21 year old Hispanic females had a **0.28 lower abortion rate** per month after the notification laws were enacted (2000 – 2004) compared to the no law period (1995 - 1999). As adults, this group was unaffected by the notification or consent laws and are used as a comparison to Hispanic females under 18.

Ages 18 - 21, White

The results show that 18 - 21 year old white females had a **0.19 higher abortion rate** per month after the notification laws were enacted (2000 – 2004) compared to the

no law period (1995 - 1999). As adults, this group was unaffected by the notification or consent laws and are used as a comparison to white females under 18.

Hypothesis 2: Parental notification and consent laws increase late care seeker (28 weeks gestation-none) rate and are predictors of the establishment of early or late prenatal care for females under 18 in Texas with the largest effect occurring after implementation of the notification laws.

Prenatal Care Rate

Table 8 presents a summary of the results for analyses related to late or no prenatal care birth rates. A description of these results is presented after the table. Only those results where $p < .05$ are noted.

Table 8. Summary of Significant Results for Late or No Prenatal Care Birth Rate Changes During the Notification and Consent Law Periods

Age & Race/Ethnicity	Late or No Prenatal Care Birth Rate
13 – 15	Late/no prenatal care birth rate decreased after notification laws were enacted Late/no prenatal care birth rate increased after consent laws were enacted
13 – 15 Black	Late/no prenatal care birth rate increased after consent laws were enacted
13 – 15 Hispanic	Late/no prenatal care birth rate decreased after notification laws were enacted Late/no prenatal care birth rate increased after consent laws were enacted
13 – 15 White	Late/no prenatal care birth rate increased after consent laws were enacted
16 – 17	Late/no prenatal care birth rate increased after consent laws were enacted
16 – 17 Black	Late/no prenatal care birth rate decreased after notification laws were enacted Late/no prenatal care birth rate increased after consent laws were enacted

Table 8 Continued

Age & Race/Ethnicity	Late or No Prenatal Care Birth Rate
16 – 17 Hispanic	Late/no prenatal care birth rate decreased after notification laws were enacted Late/no prenatal care birth rate increased after consent laws were enacted
16 – 17 White	Late/no prenatal care birth rate increased after consent laws were enacted
Comparison Groups	
18 – 21	Late/no prenatal care birth rate increased after consent laws were enacted
18 – 21 Black	Late/no prenatal care birth rate increased after consent laws were enacted
18 – 21 Hispanic	Late/no prenatal care birth rate increased after consent laws were enacted
18 – 21 White	Late/no prenatal care birth rate increased after consent laws were enacted

Ages 13 - 15, Races Combined

The results show that 13 - 15 year old females had a **0.01 lower late/no prenatal care birth rate** per month after the notification laws were enacted (2000 – 2004) compared to the no law period (1995 - 1999). Additionally, 13 - 15 year old females had a **0.04 higher late/no prenatal care birth rate** per month after the consent laws were enacted (2005 – 2009) compared to the notification law period (2000 - 2004).

Ages 13 - 15, Black

The results show that 13 - 15 year old Black females had **a 0.07 higher late/no prenatal care birth rate** per month after the consent laws were enacted (2005 – 2009) compared to the notification law period (2000 - 2004).

Ages 13 - 15, Hispanic

The results show that 13 - 15 year old Hispanic females had a **0.04 lower late/no prenatal care birth rate** per month after the notification laws were enacted (2000 –

2004) compared to the no law period (1995 - 1999). Additionally, 13 - 15 year old Hispanic females had a **0.05 higher late/no prenatal care birth rate** per month after the consent laws were enacted (2005 – 2009) compared to the notification law period (2000 - 2004).

Ages 13 - 15, White

The results show that 13 - 15 year old white females had a **0.01 higher late/no prenatal care birth rate** per month after the consent laws were enacted (2005 – 2009) compared to the notification law period (2000 - 2004).

Ages 16 - 17, Races Combined

The results show that 16 - 17 year old females had a **0.24 higher late/no prenatal care birth rate** per month after the consent laws were enacted (2005 – 2009) compared to the notification law period (2000 - 2004).

Ages 16 - 17, Black

The results show that 16 - 17 year old Black females had a **0.08 lower late/no prenatal care birth rate** per month after the notification laws were enacted (2000 – 2004) compared to the no law period (1995 - 1999). Additionally, results show that 16 - 17 year old Black females had a **0.31 higher late/no prenatal care birth rate** per month after the consent laws were enacted (2005 – 2009) compared to the notification law period (2000 - 2004).

Ages 16 - 17, Hispanic

The results show that 16 - 17 year old Hispanic females had a **0.20 lower late/no prenatal care birth rate** per month after the notification laws were enacted (2000 –

2004) compared to the no law period (1995 - 1999). Additionally, 16 - 17 year old Hispanic females had a **0.36 higher late/no prenatal care birth rate** per month after the consent laws were enacted (2005 – 2009) compared to the notification law period (2000 - 2004).

Ages 16 - 17, White

The results show that 16 - 17 year old white females had a **0.09 higher late/no prenatal care birth rate** per month after the consent laws were enacted (2005 – 2009) compared to the notification law period (2000 - 2004).

Ages 18 - 21, Races Combined

The results show that 18 - 21 year old females had a **0.43 higher late/no prenatal care birth rate** per month after the consent laws were enacted (2005 – 2009) compared to the notification law period (2000 - 2004). As adults, this group was unaffected by the notification or consent laws and are used as a comparison to females under 18.

Ages 18 - 21, Black

The results show that 18 - 21 year old Black females had a **0.49 higher late/no prenatal care birth rate** per month after the consent laws were enacted (2005 – 2009) compared to the notification law period (2000 - 2004). As adults, this group was unaffected by the notification or consent laws and are used as a comparison to Black females under 18.

Ages 18 - 21, Hispanic

The results show that 18 - 21 year old Hispanic females had a **0.58 higher late/no prenatal care birth rate** per month after the consent laws were enacted (2005 – 2009) compared to the notification law period (2000 - 2004). As adults, this group was unaffected by the notification or consent laws and are used as a comparison to Hispanic females under 18.

Ages 18 - 21, White

The results show that 18 - 21 year old white females had a **0.27 higher late/no prenatal care birth rate** per month after the consent laws were enacted (2005 – 2009) compared to the notification law period (2000 - 2004). As adults, this group was unaffected by the notification or consent laws and are used as a comparison to white females under 18.

Hypothesis 3: Parental notification and consent laws increase the incidence of "poor health outcomes" defined as low birth weight (0-2499 grams) birth rate and preterm delivery (0-36 weeks' gestation) birth rate for females under 18 in Texas with the largest effect occurring after implementation of the notification laws.

Low Birth Weight Rate

Table 9 presents a summary of the results for analyses related to low birth weight birth rates. A description of these results is presented after the table. Only those results where $p < .05$ are noted.

Table 9. Summary of Significant Results for Low Birth Weight Birth Rate Changes During the Notification and Consent Law Periods

Age & Race/Ethnicity	Low Birth Weight Birth Rate
13 – 15	
13 – 15 Black	
13 – 15 Hispanic	
13 – 15 White	
16 – 17	Low birth weight birth rate decreased after notification laws were enacted Low birth weight birth rate further decreased after consent laws were enacted
16 – 17 Black	
16 – 17 Hispanic	Low birth weight birth rate decreased after notification laws were enacted
16 – 17 White	Low birth weight birth rate decreased after notification laws were enacted
Comparison Groups	
18 – 21	
18 – 21 Black	
18 – 21 Hispanic	Low birth weight birth rate decreased after notification laws were enacted
18 – 21 White	Low birth weight birth rate increased after notification laws were enacted

Ages 16 - 17, Races Combined

The results show that 16 - 17 year old females had a **0.04 lower low birth weight rate** per month after the notification laws were enacted (2000 – 2004) compared to the no law period (1995 - 1999). Additionally, 16 - 17 year old females had a **0.02 lower low birth weight rate** per month after the consent laws were enacted (2005 – 2009) compared to the notification law period (2000 - 2004).

Ages 16 - 17, Hispanic

The results show that 16 - 17 year old Hispanic females had a **0.08 lower low birth weight rate** per month after the notification laws were enacted (2000 – 2004) compared to the no law period (1995 - 1999). The further demand for consent had no effect on the low birth weight birth rate for this group.

Ages 16 - 17, White

The results show that 16 - 17 year old white females had a **0.02 lower low birth weight rate** per month after the notification laws were enacted (2000 – 2004) compared to the no law period (1995 - 1999). The further demand for consent had no effect on the low birth weight birth rate for this group.

Ages 18 - 21, Hispanic

The results show that 18 - 21 year old Hispanic females had a **0.12 lower low birth weight rate** per month after the notification laws were enacted (2000 – 2004) compared to the no law period (1995 - 1999). As adults, this group was unaffected by the notification or consent laws and are used as a comparison to Hispanic females under 18.

Ages 18 - 21, White

The results show that 18 - 21 year old white females had a **0.04 higher low birth weight rate** (low birth weight births per 1,000 18 - 21 year old white females) per month after the notification laws were enacted (2000 – 2004) compared to the no law period (1995 - 1999). As adults, this group was unaffected by the notification or consent laws and are used as a comparison to white females under 18.

Preterm Delivery Rate

Table 10 presents a summary of the results for analyses related to preterm delivery birth rates. A description of these results is presented after the table. Only those results where $p < .05$ are noted.

Table 10. Summary of Significant Results for Preterm Delivery Birth Rate Changes During the Notification and Consent Law Periods

Age & Race/Ethnicity	Preterm Delivery Birth Rate
13 – 15	Preterm delivery birth rate increased after consent laws were enacted
13 – 15 Black	Preterm delivery birth rate decreased after notification laws were enacted
13 – 15 Hispanic	Preterm delivery birth rate increased after consent laws were enacted
13 – 15 White	
16 – 17	Preterm delivery birth rate decreased after notification laws were enacted Consent laws further decreased preterm delivery birth rate further decreased after consent laws were enacted
16 – 17 Black	Preterm delivery birth rate decreased after notification laws were enacted
16 – 17 Hispanic	Preterm delivery birth rate decreased after notification laws were enacted Consent laws further decreased preterm delivery birth rate further decreased after consent laws were enacted
16 – 17 White	
Comparison Groups	
18 – 21	
18 – 21 Black	
18 – 21 Hispanic	Preterm delivery birth rate decreased after notification laws were enacted
18 – 21 White	Preterm delivery birth rate increased after notification laws were enacted

Ages 13 - 15, Races Combined

The results show that 13 - 15 year old females had a **0.01 higher preterm delivery rate** per month after the consent laws were enacted (2005 – 2009) compared to the notification law period (2000 - 2004).

Ages 13 - 15, Black

The results show that 13 - 15 year old Black females had a **0.03 lower preterm delivery rate** per month after the notification laws were enacted (2000 – 2004) compared to the no law period (1995 - 1999). The further demand for consent had no effect on the preterm delivery birth rate for this group.

Ages 13 - 15, Hispanic

The results show that 13 - 15 year old Hispanic females had a **0.01 higher preterm delivery rate** per month after the consent laws were enacted (2005 – 2009) compared to the notification law period (2000 - 2004).

Ages 16 - 17, Races Combined

The results show that 16 - 17 year old females had a **0.04 lower preterm delivery rate** per month after the notification laws were enacted (2000 – 2004) compared to the no law period (1995 - 1999). Additionally, 16 - 17 year old females had a **0.06 lower preterm delivery rate** per month after the consent laws were enacted (2005 – 2009) compared to the notification law period (2000 - 2004).

Ages 16 - 17, Black

The results show that 16 - 17 year old Black females had a **0.09 lower preterm delivery rate** per month after the notification laws were enacted (2000 – 2004) compared to the no law period (1995 - 1999). The further demand for consent had no effect on the preterm delivery birth rate for this group.

Ages 16 - 17, Hispanic

The results show that 16 - 17 year old Hispanic females had a **0.10 lower preterm delivery rate** per month after the notification laws were enacted (2000 – 2004) compared to the no law period (1995 - 1999). Additionally, 16 - 17 year old Hispanic females had a **0.10 lower preterm delivery rate** per month after the consent laws were enacted (2005 – 2009) compared to the notification law period (2000 - 2004).

Ages 18 - 21, Hispanic

The results show that 18 - 21 year old Hispanic females had a **0.21 lower preterm delivery rate** per month after the notification laws were enacted (2000 – 2004) compared to the no law period (1995 - 1999). As adults, this group was unaffected by the notification or consent laws and are used as a comparison to Hispanic females under 18.

Ages 18 - 21, White

The results show that 18 - 21 year old white females had a **0.10 higher preterm delivery rate** per month after the notification laws were enacted (2000 – 2004) compared to the no law period (1995 - 1999). As adults, this group was unaffected by the notification or consent laws and are used as a comparison to white females under 18.

Hypothesis 4: Parental notification and consent laws increase second trimester abortion rate in 18 year old females in Texas with the largest effect occurring after implementation of the notification laws.

Second Trimester Abortion Rate

Table 11 presents a summary of the results for analyses related to second trimester abortion rates. A description of these results is presented after the table. Only those results where $p < .05$ are noted.

Table 11. Summary of Significant Results for Second Trimester Abortion Rate Changes During the Notification and Consent Law Periods

Age & Race/Ethnicity	Second Trimester Abortion Rate
17	Second trimester abortion rate increased after consent laws were enacted
17 Black	
17 Hispanic	
17 White	
18	Second trimester abortion rate increased after consent laws were enacted
18 Black	
18 Hispanic	
18 White	
Comparison Groups	
19	Second trimester abortion rates were higher after consent laws were enacted
19 Black	Second trimester abortion rates were higher after consent laws were enacted
19 Hispanic	
19 White	Second trimester abortion rates were higher after notification laws were enacted Second trimester abortion rates further increased after consent laws were enacted

Age 17, Races Combined

The results show that 17 year old females had a **0.02 higher second trimester abortion rate** per month after the consent laws were enacted (2005 – 2009) compared to the notification law period (2000 - 2004).

Age 18, Races Combined

The results show that 18 year old females had a **0.06 higher second trimester abortion rate** per month after the consent laws were enacted (2005 – 2009) compared to the notification law period (2000 - 2004).

Age 19, Races Combined

The results show that 19 year old females had a **0.04 higher second trimester abortion rate** per month after the consent laws were enacted (2005 – 2009) compared to the notification law period (2000 - 2004). This group was unaffected by the notification or consent laws and are used as a comparison to females age 17 or 18.

Age 19, Black

The results show that 19 year old Black females had a **0.10 higher second trimester abortion rate** per month after the consent laws were enacted (2005 – 2009) compared to the notification law period (2000 - 2004). This group was unaffected by the notification or consent laws and are used as a comparison to Black females age 17 or 18.

Age 19, White

The results show that 19 year old white females had a **0.04 higher second trimester abortion rate** per month after the notification laws were enacted (2000 – 2004) compared to the no law period (1995 - 1999). Additionally, 19 year old white

females had a **0.05 higher second trimester abortion rate** per month after the consent laws were enacted (2005 – 2009) compared to the notification law period (2000 - 2004).

Table 12 below summarizes the significant findings described above by changes in the law periods.

Table 12. Summary of Significant Findings per Law Period by Age and Race/Ethnicity Categories

Age and Race/Ethnicity Categories	POTENTIAL EFFECTS OF NOTIFICATION	POTENTIAI EFFECTS OF CONSENT OVER AND ABOVE NOTIFICATION
13 – 15 year olds	Lower low/no prenatal care birth rate	Higher abortion rate Higher low/no prenatal care birth rate Higher preterm delivery birth rate
Black	Lower preterm delivery birth rate	Higher abortion rate Higher low/no prenatal care birth rate
Hispanic	Lower birth rate Lower low/no prenatal care birth rate	Higher low/no prenatal care birth rate Higher preterm delivery birth rate
White		Higher low/no prenatal care birth rate
16 – 17 year olds	Lower abortion rate Lower low birth weight birth rate Lower preterm delivery birth rate	Higher low/no prenatal care birth rate Lower low birth weight birth rate Lower preterm delivery birth rate
Black	Lower birth rate Fewer abortions Lower low/no prenatal care birth rate Lower preterm delivery birth rate	Higher low/no prenatal care birth rate
Hispanic	Lower birth rate Lower abortion rate Lower low/no prenatal care birth rate Lower low birth weight birth rate Lower preterm delivery birth rate	Higher low/no prenatal care birth rate Lower preterm delivery birth rate
White	Lower abortion rate Lower low birth weight birth rate	Higher low/no prenatal care birth rate

Table 12 Continued

Age and Race/Ethnicity Categories	Changes between Notification (2000 – 2004) and No (1995 – 1999) Law Periods	Changes between Consent (2005 – 2009) and Notification (2000 – 2004) Law Periods
Comparison Groups		
18 – 21 year olds	Higher birth rate	Higher abortion rate Higher low/no prenatal care birth rate
Black		Higher low/no prenatal care birth rate
Hispanic	Lower birth rate Lower abortion rate Lower low birth weight birth rate Lower preterm delivery birth rate	Higher low/no prenatal care birth rate
White	Higher birth rate Higher abortion rate Lower low birth weight birth rate Higher preterm delivery birth rate	Higher low/no prenatal care birth rate
Age and Race/Ethnicity Categories	POTENTIAL EFFECTS OF NOTIFICATION (2nd Trimester Abortion only)	POTENTIAI EFFECTS OF CONSENT OVER AND ABOVE NOTIFICATION (2nd Trimester Abortion only)
17 year olds		Higher second trimester abortion rate
Black		
Hispanic		
White		
18 year olds		Higher second trimester abortion rate
Black		
Hispanic		
White		
Comparison Groups		
	Changes between Notification (2000 – 2004) and No (1995 – 1999) Law Periods	Changes between Consent (2005 – 2009) and Notification (2000 – 2004) Law Periods
19 year olds		Higher second trimester abortion rate
Black		Higher second trimester abortion rate
Hispanic		
White	Higher second trimester abortion rate	Higher second trimester abortion rate

CHAPTER IV

DISCUSSION

The purpose of this study was to investigate the effects of parental notification and consent laws on teenage pregnancy and births and the various outcomes related to both. The results show relationships that policy makers and health care providers may choose to investigate further to determine the role state and federal legislation play in terms of the health of teens and their children. There are also numerous societal issues for consideration such as the expenses incurred in direct and indirect care for the mother and child, incomplete formal education for both, ongoing welfare requirements, and other problems many teenage pregnancies bring, requiring action by the family and community. Texas passed and actively enforces parental notification and consent laws. The law reads "A physician who intentionally performs an abortion on a pregnant unemancipated minor in violation of this section commits an offense. An offense under this subsection is punishable by a fine not to exceed $10,000." (Family Code 33.002). The gravity and ramifications of this law to the health care provider and most importantly the minor female requires focused investigation and understanding of all aspects of teenage pregnancy and birth.

The results of this study may further assist the understanding of the challenges of teen pregnancy and birth and their related societal concerns. The dependent variables were birth, abortion, prenatal care, low birth weight, preterm delivery, and second trimester abortion rates. For each of the dependent variables studied, there are significant results, which will be discussed in detail below.

Births

In this research, the hypothesis related to births states that parental notification and consent laws increase births to minors and decrease abortions for females under 18 in Texas with the largest effect occurring after implementation of the notification laws. The data reveal several significant findings in both age and race/ethnicity categories for birth rate changes because of the notification and consent law enactment.

Comparing the three age categories of 13 - 15, 16 - 17, and 18 - 21 year old females within each of the timeframes, there were noticeable differences when using the 18 - 21 year olds as the control group. These females serve as the comparison group as they were not affected by the legislation.

When looking at births for 13 - 15 and 16 - 17 year olds without regard for race/ethnicity, birth rate did not change significantly in the time periods of 2000 - 2004 when notification laws were enacted nor in 2005 - 2009 when consent laws were enacted. However, the control group of 18 - 21 year old females saw an increase in birth rate during the notification time period compared to the no law time period (1995 – 1999). The legislation may have had a suppressing effect upon the other two younger age groups due to a fear of unintended pregnancy and the requirement to notify their parents if they chose to have an abortion.

Other potential influencing factors are the increasing awareness and education related to birth control and sexual education. Ongoing sexual education programs to prevent unwanted pregnancies and sexually transmitted diseases are credited with the declining birth rates in teenagers. Much of the education includes information about

effective birth control methods, particularly the use of dual contraception such as condoms along with the Pill or other hormonal means (Martinez, Copen, & Abma, 2011).

Exploring differences among race/ethnicity categories of Black, Hispanic, and white showed no change in birth rate for Black or white 13 - 15 year olds during the notification or consent law timeframes. Hispanic females in this age group showed a decrease of 15 births per 100,000 13 – 15 year old Hispanic females during the notification timeframe compared to the no law time period, suggesting a possible effect related to the notification legislation. Although the 13 - 15 year old Hispanic decrease in birth rate suggests a relationship with the notification legislation, a competing influence may be the simple fact that this younger age group does not drive, have closer interactions with their parents, and generally less freedom, thus limiting their ability for privacy and sexual activities. Additionally, the total number of births is smaller, thus an intervention of any type can affect the rate.

It is important to note that Hispanic birth rates in this study far exceed those of all other races. As the numbers of Hispanics grow in the United States, it is critical to concentrate on their reproductive health. In particular, as of 2007, Texas had 36 percent of its residents with Hispanic heritage; this is second only to California (U.S. Census Bureau, 2008). Additionally, the population in Texas is younger than the United States average due to the higher birth rate. In 2007, in Texas births to Hispanics were a little over half of the total births (U.S. Census Bureau, 2008). Research suggests that the more conservative and religious attitudes deter the use of contraception (Durant,

Seymore, Pendergrast, & Beckman, 1990). Another reason these birth rates did not drop further may be related to education. Compared to all other races and ethnicities, Hispanics have a lower level of education and higher dropout rate from high school (Driscoll, Biggs, Brindis, & Yankah, 2001). Although the data show a decrease in birth rate, the notification legislation may mask a more prominent decrease in the numbers of births to Hispanic teens aged 13 - 15 years.

In the category of 16 - 17 year old females of all races/ethnicities, there was no significant effect from the legislation; however, Black and Hispanic 16 - 17 year olds did see reductions in birth rate. Births to Black females reduced by 33 births per 100,000 16 – 17 year old Black females in the time frame of notification. Hispanic 16 - 17 year old females saw a decrease in births of 75 per 100,000 16 – 17 Hispanic females also within the time period of notification.

These results are interesting and are not consistent with the study's hypothesis that births would increase due to the notification or consent legislation. An alternative and plausible reason for the reduction in births may simply be the previously acknowledged downward trend of births to teens over the last several years. Yet there is still a disparity in birth rates to whites compared to Black and Hispanic teens. Preliminary data for 2010 show white teens had 23.5 births per 1,000 females, Blacks had 51.5 births per 1,000 females, and Hispanics remain the highest with 55.7 births per 1,000 teenage females (Hamilton & Ventura, 2012).

While the decreasing birth rate on a national basis and in Texas is a promising direction for all teen births, might they have gone down even more without the

restrictions of the parental notification and consent laws? The white teens in the same age group showed no significant reduction or increase in births through the time frames studied. This may be a reflection of the white socioeconomic status as well as the already low numbers of teen births in this category. In 2006, the percent of Hispanics living in poverty was almost twenty-one percent, Blacks living in poverty was approximately twenty-four percent, while whites living in poverty was eight percent (Logan & Westrich, 2008). There is a strong relationship between teen pregnancy and low socioeconomic status, particularly income (Blum, Beuhring, Shew, Bearinger, Sieving, & Resnick, 2000).

The 18 - 21 year old females had no significant changes in birth rate for Blacks, but Hispanics showed a decrease of 136 births per 100,000 18 – 21 year old Hispanic females and whites had an increase of 66 births per 100,000 18 - 21 white females during the timeframe of 2000 - 2004 when the notification law came into effect. The decrease in Hispanic births and the increase in births to white 18 - 21 year olds warrants further investigation. This may be representative of a culture change, a reflection of economics, or some other external influence not readily identifiable in this study.

Abortions

In the United States, approximately 25 percent of teen pregnancies are terminated by abortion (Curtin, Abma, Ventura, & Henshaw, 2013). The reasons vary. Concerns over finishing formal education, financial worries, parental pressure, or lack of maturity all affect their decision (Guttmacher, 1999).

As was previously mentioned, the first hypothesis for this research states that parental notification and consent laws not only will increase births to minors, but will also decrease abortions for females under 18 in Texas with the largest effect occurring after implementation of the notification laws. The data show significant findings within the age and race/ethnicity categories for abortion and these rate changes may be potentially due to the enactment of the notification and consent laws. A review of the three age categories of 13 - 15, 16 – 17, and 18 - 21 year old females in the three the time periods shows differences through the use of the 18 - 21 year olds as the control group. These females serve as the control group as these adult females were not subjected to the legislation.

Abortions for all females aged 13 - 15 increased by 0.01 per 1,000 13 – 15 year old females or one in 100,000 during the time frame of 2005 - 2009 when the law was made more stringent, requiring parental consent. Blacks within this age group showed an increase of six abortions in 100,000 Black females aged 13-15 within the time period necessitating consent. There were no other significant changes for this age group.

The younger adolescent by necessity, has more parental involvement in their lives. These females do not drive, are not able to be formally employed, and are dependent upon their parents for finances. An increase of one abortion per 100,000 13 – 15 year old females across all races and six per 100,000 13 – 15 year old Black females, although statistically significant, are still small in number. The number of total pregnancies for this age group is also very small. However, Blacks have more than twice the number of abortions than the national average. Black teens have abortions

approximately four times more frequently than white teens. Abortions have a strong relationship to low socioeconomic status, lower education, and a lack of attention on high-risk teens (Guttmacher, 2008).

In the age group of 16 - 17 year old females, the results support the hypothesis of a reduction in abortions due to the enactment of the legislation in Texas. Comparing the time period of no parental notification or consent laws and the first time period of the notification requirement, abortions decreased by 17 per 100,000 females of all races/ethnicities aged 16 - 17 years. Within each of the race/ethnicity groups, abortions decreased as well. For Blacks, the data show a reduction of 16 abortions per 100,000 16 – 17 year old Black females, Hispanic females' abortions reduced by 26 in 100,000 16 – 17 year old Hispanic females, and abortions in white females went down by 15 per 100,000 16 – 17 year old white females during the requirement of notification (years 2000 - 2004).

The enactment of the legislation requiring notification of a parent prior to performing an abortion on a minor reduced the number of abortions in this age category for all races/ethnicities. The teens in this age group are more mobile, have more freedom, and are more sexually active than their younger counterparts (Guttmacher, 2008). They may have a heightened awareness of the problems they may have in their future if they become mothers at such a young age. Thus, it is not surprising that they may become pregnant less and thus have fewer abortions. It should be noted that teen pregnancy, births, and abortions are all trending downward in the United States and in Texas (Curtin et al, 2013) which also may affect the total numbers of abortions.

These data are influential in supporting the hypothesis of a reduction in abortions due to the enactment of the parental notification and consent legislation. The comparison group who are not affected by the legislation show an increase in abortions of 12 per 100,000 18 – 21 year old females across all races during the time period requiring consent by parents, 2005 - 2009. There was no significant change in abortions for 18 – 21 year old Black females. During the period when notification only was required, through the years of 2000 - 2004, the data show a decrease of 28 abortions per 100,000 18 – 21 year old Hispanic females, and an increase of 19 abortions per 100,000 white females aged 18 - 21. The decrease in the number of abortions within the Hispanic category may reflect cultural differences, or other influences not readily identified within this study.

Prenatal Care

The relationship between early and frequent prenatal care during pregnancy and the health of the mother and infant is strong. Effective prenatal care includes counseling by the health care provider to encourage healthy behaviors, shared decision making between the woman and her care team, and medical testing to evaluate the health of the mother and the fetus (Kirkham, Harris, & Grzybowski, 2005). A coordinated program that balances medical care and psychosocial support is ideal to avoid bad outcomes in pregnancy and birth. Research shows that women who prepare for pregnancy prior to conception have improved gestation, labor, and delivery as well as better chances for a healthy infant (Kirkham, Harris, & Grzybowski, 2005). Such preparation includes healthy behaviors such as smoking cessation, lessening or eliminating alcohol

consumption, adequate nutrition, and folic acid supplementation. Attention to the mother's health prior to conception may lessen the risks of poor outcomes and helps prepare the mother and family for pregnancy and birth (Jack & Culpepper, 1990).

Late or no prenatal care is defined as obstetrical care obtained at 28 weeks' gestation or later. Twenty-eight weeks marks the beginning of the third trimester of pregnancy. Routine and early prenatal care begins in the first trimester, usually around seven to eight weeks' gestation and includes a review of the physical and social concerns of the mother, medical testing and ultrasound to adequately confirm the dates of conception and expected delivery (American Congress of Obstetricians and Gynecologists, 2006).

The data from this study show significant effects in almost all age and race/ethnicity categories. For the age group 13 - 15 among all races/ethnicities, birth rates to teens without sufficient prenatal care increased by four births per 100,000 13 – 15 year old females in the time period of consent (2005 - 2009) over the previous time period of notification (2000 - 2004). Interestingly, teen births decreased by one birth per 100,000 13 – 15 year old females in the time period of notification compared to the years with no legislation (1995-1999). This suggests that in the years of 2005 - 2009 when parental consent was required for an abortion, births to teens aged 13 - 15 who obtained late or no prenatal care increased in comparison to the previous timeframe where only parental notification was required.

The data also show significant findings in each of the race/ethnicity categories within the 13 - 15 year age group. Births to Black teens obtaining late or no prenatal

care increased by seven births per 100,000 13 – 15 year old Black females in the consent time frame compared to the notification time frame. Also higher in the consent time frame were late or no prenatal care births to Hispanic and white teens, resulting in five more late or no prenatal care births per 100,000 13 – 15 year old Hispanic females and one more late or no prenatal care birth per 100,000 females 13 – 15 year old white females.

These results are concerning as prenatal care is very important for the mother and baby. This suggests the restrictive legislation may delay these girls' decision to seek prenatal care; however, the evidence is not definitive. Another plausible cause may be lack of transportation to access care or simply not understanding the importance of prenatal care for a healthy pregnancy. The data also show within the Hispanic 13 - 15 year old group, teens that obtained late or no prenatal care decreased by four births per 100,000 13 – 15 year old Hispanic females in the time frame of notification (2000 - 2004). Further investigation is needed to determine why the notification time period resulted in fewer births to Hispanics getting late or no prenatal care and the consent time frame (2005 - 2009) showed more births to Hispanics receiving late or no prenatal care. Perhaps the legislation provided needed attention to teen pregnancy and its related outcomes initially, but as time passed, the focus changed and the consent laws did, in influence teens and their access to early prenatal care.

For 16 - 17 year olds across all races/ethnicities, there was an increase in obtaining late or no prenatal care of 24 births per 100,000 16 – 17 year old females. Black 16 - 17 year old females had a reduction of eight births per 100,000 16 – 17 year

old Black females without adequate prenatal care during the notification time period, but this number increased to 31 births per 100,000 16 – 17 year old Black females during the consent time period. The Hispanic females also had a reduction in births with little or no prenatal care during the notification time period of 20 births per 100,000 16 – 17 year old Hispanic females and then an increase in the consent time period of 31 births per 100,000 Hispanic females aged 16 - 17. Additionally, white females had an increase of nine births per 100,000 16 – 17 year old white females with little or no prenatal care during the consent time period. This shows the more stringent time period of consent may have affected these teens negatively because they waited too long for prenatal care or they did not obtain any care at all. These results support the hypothesis that the consent laws increase the number of births to teens without adequate prenatal care. This may illustrate the reaction of a teen that attempts to hide their pregnancy from their parents. Additionally, there is often a lack of education and understanding related to the importance of good prenatal care for a healthy pregnancy and birth.

In the control group of 18 - 21 year olds, all of the females in all groups showed an increase in the number of births born to mothers with little or no prenatal care in the consent timeframe. In the category including all races/ethnicities, the number of births rose by 43 per 100,000 18 – 21 year old females. Blacks had an increase of 49 births per 100,000 18 – 21 year old Black females, Hispanics increased by 58 per 100,000 18 – 21 year old Hispanic females, and whites by 27 per 100,000 18 – 21 year old white females.

As the notification or consent laws did not affect these females, economics may play into the reasons behind the increases for all age groups and would explain the

decrease in the teens that sought prenatal care in the notification time period, which reflects the years of 2000 - 2004. The consent time period is 2005 - 2009. The United States experienced a downward economic trend in these latter years leading to a financial crisis in 2008 related to lending practices and a fall in the housing sector. Accompanying this situation was an unstable work force resulting in numerous layoffs (Swagel, P., 2010). This economic downturn forced many Americans into forgoing any preventative health care services. Directly connected to this financial strain was the decline in tax revenues that the states would use to fund their respective Medicaid programs, which had the increased burden of new enrollees due to the economy (Kaiser Family Foundation, 2008). One could surmise that health care availability as supported by health insurance was further restricted, potentially limiting the numbers of females of all ages obtaining prenatal care during health their pregnancies.

Poor Health Outcomes

The third hypothesis of this study contends that parental notification and consent laws increase the incidence of "poor health outcomes". The definitions of such outcomes in the medical field are babies born at low birth weight (0 - 2,499 grams) as well as those born preterm, which is a birth at 0 - 36 weeks' gestation. This study argues that more restrictions on accessible abortions increase births to teenagers. Teens often exhibit risky behaviors, possibly affecting the health of their babies. Such behaviors include drinking, smoking, illegal drugs, and intentional attempts to limit weight gain (Guttmacher, 2005). These behaviors, coupled with late or no prenatal care further attribute to poor outcomes in teenagers.

Low Birth Weight

Low birth weight babies are at higher risk for slower physical and cognitive development as well as having an increased susceptibility to chronic diseases later in life (Stevens-Simon & Orleans, 1999). The definition of a low birth weight infant is a child that weighs less than 5.5 pounds or 2500 grams (Kramer, 1987). Low birth weight serves as one of the ways to measure the health of the infant and its chances of survival. This predictor of health for the infant is often directly related to poor maternal nutrition, little or no prenatal care, and risky behaviors of the mother such as drinking alcohol or smoking (Stevens-Simon & Orleans, 1999). These behaviors are frequently evident in teen mothers (Guttmacher, 2011). Additionally, low birth weight babies are most common in women experiencing their first pregnancy and in women under 17 years old and over 35 years old (Burd, 2013).

In the age category of 13 - 15 year olds across all races/ethnicities, there were no significant results in any of the time periods for low birth weight babies. This is suggestive of both the aforementioned parental involvement in these young teens as well as the low numbers of pregnancies and births to females in this age category. Additionally, as noted above, this age category as a whole had increased timely pregnancies with appropriate timing of prenatal care, which is a predictor of good or bad birth outcomes (Kirkham, Harris, & Grzybowski, 2005).

For the births to teens aged 16 - 17 in all races combined, there was a reduction in babies born with low birth weight of four births per 100,000 16 – 17 year old females. This was during the notification time frame and there was a reduction of two low birth

weight babies per 100,000 16 – 17 year old females during the consent time period compared to the previous time period. Blacks showed no significant increase or decrease, but Hispanics had fewer low birth weight babies during the notification time period of eight fewer births per 100,000 16 – 17 year old Hispanic females and whites also had fewer low birth weight babies by two per 100,000 16 – 17 year old white females during the notification time period of 2000 - 2004. These results, when interpreted in a separate and distinct viewpoint are positive and encouraging simply because there are fewer babies born at a low birth weight. However, it is very important to incorporate these results into the entire picture of teen pregnancy and legislation in Texas. The question to answer is how much more of a decrease in these births and their related poor outcomes might we see for Hispanics and whites without the restrictive legislation in Texas as well as a significant decrease for Black females?

Hispanics in the control group of 18 - 21 year olds continued the downward trend having 12 fewer low birth weight babies in 2000 - 2004 than during the years of 1995 - 1999 when there was no parental notification law. These data for the Hispanic females may be a reflection on cultural behaviors that include more involvement of immediate and extended family in the caring for adolescents and children, thus providing young mothers with more education and support through their pregnancy.

Blacks again showed no significant change in low birth weight babies in any of categories or in the time periods. White females aged 18 - 21 showed an increase of four babies born with low birth weight per 100,000 18 – 21 year old white females during the notification time period. This contrasts with the decrease in low birth weight babies to

whites aged 16 - 17 years old. A plausible explanation is the influence of the parents on the younger teen as they are likely still living in the same house and under the parent's health insurance, while young adults have often moved out and no longer have health insurance or have less robust benefits. The latter can influence health care decision-making and thus the outcome of a young adult's pregnancy.

Preterm Delivery

The definition of preterm delivery is the delivery of the infant at less than 37weeks' gestation. Normal gestation is 40 weeks (Centers for Disease Control and Prevention, 2012). The aforementioned importance of prenatal care is critical in the reduction of the incidence of preterm labor and delivery. Preterm birth is the leading cause of infant mortality in the United States, representing one-third of deaths to infants in 2002 (Callaghan, MacDorman, Ramussen, Qin, & Lackriz, 2006).

From 1990 to 2006, the United States showed a 20 percent increase in the number of premature births (American College of Obstetricians and Gynecologists, 2012). Research shows that teenagers have a higher rate of preterm birth and this rate increases with the decreasing of maternal age as well as an increase in neonatal mortality that is directly associated with the age of the mother (Otterblad, Olausson, Cnattingius, & Haglund, 2005). Additionally, infants that are born before term are at risk for neurologic impairment, physical disabilities and developmental delays (Tucker & McGuire, 2004).

Across all races in the age group of 13 - 15 year old females, preterm deliveries increased during the consent time period of one birth per 100,000 13 – 15 year old

females. Black preterm births decreased by three births per 100,000 13 – 15 year old Black females during the notification only time period, and Hispanics' preterm births increased during the consent only time period by one birth per 100,000 13 – 15 year old Hispanic females. There was no significant change in white 13 - 15 year olds.

Although teenagers are generally in better condition physically and have less chronic diseases, research associates preterm delivery with adolescence. The general explanation is the adolescent is still growing and developing. The physical development of their reproductive organs is ongoing and lends itself to increased risk for preterm delivery. (Stevens-Simon, Beach, & McGregor, 2002). In the very young group of 13 - 15 year olds, the increase of preterm births is not completely unexpected. Preterm births to these teens as they were subjected to the parental consent laws in Texas suggest their pregnancies were already high risk and the requirement of consent prior to obtaining an abortion increased this particular birth outcome.

The decrease of preterm births to Black females aged 13 - 15 in the notification time period may be an effect related to the ongoing reduction in the birth rate in teens in Texas and nationally. The increase in the preterm births to Hispanic females aged 13 - 15 years during the consent time period is also possibly connected to the increase in the Hispanic population in Texas as discussed previously as well as the very young age of the mother.

For all races/ethnicities, 16 - 17 year old females saw a decrease in preterm deliveries during the notification period of four preterm delivery births per 100,000 16 – 17 year old females and six births' reduction per 100,000 16 – 17 year old females in the

consent period. Black 16 - 17 year olds had a reduction in preterm deliveries during the notification only time period of nine preterm births per 100,000 16 – 17 year old Black females. Hispanic 16 - 17 year olds females had 10 fewer preterm births per 100,000 16 - 17 year old Hispanic females during the notification time period and another 10 fewer preterm births per 100,000 16 – 17 year old Hispanic females during the consent time period. This dramatic reduction may speak to the familial support the teen experiences within the Hispanic culture, which increases the health and well-being of the mother and baby. Research suggests that there is less stigma in the Hispanic community with regard to teen pregnancy as compared to white or Black teens (Wiemann, Vaughn, Berenson, & Volk, 2005).

The control group of 18 - 21 year olds support the theory that Hispanics have increased care within the family as they also show a significant reduction in preterm deliveries of 21 per 100,000 18 – 21 year old Hispanic females in the notification time period. Whites show an increase in the poor outcome of 10 more preterm deliveries per 100,000 18 – 21 year old white females during the notification period. This again may speak to the cultural difference of less involvement and ongoing support with the family and less connection to community.

Second Trimester Abortion

Weeks and trimesters are the means of measuring gestational age. The second trimester of pregnancy is 13 - 27 weeks. There is significant growth and development in this stage of a pregnancy. Throughout this trimester, the mother will start to feel fetal movement, the liver and pancreas becomes more functional, eyes are developed and the

fetus can hear. At 22 - 24 weeks, if born, the infant has a fair chance of survival with the assistance of medical intervention and technology (American College of Obstetricians and Gynecologists, 2006). Because this stage of the pregnancy and its potential viability is distinct in the ongoing development of the fetus as well as the mother, the consideration of second trimester abortion for many women is not without stress and anxiety.

Most abortions are performed in the first trimester or up to twelve weeks' gestation. In 2006, 88 percent of abortions performed in the United States were within the first trimester (Pazol, Gamble, Parker, Cook, Zane, & Hamdan, 2010). Second trimester abortions are more costly financially, have more medical risks associated, and are offered by few providers, thus are more difficult to obtain (Jones & Kooistra, 2011). Past studies show that for those second trimester abortions, teens represent a higher proportion than adults. Second trimester abortions performed in 2006 showed 16 percent were for teens aged 15 - 19 years compared to12 percent of all females (Pazol, et al, 2010).

One of hypotheses for this study states that parental notification and consent laws in Texas will increase the number of second trimester abortions in 18 year olds. In order to avoid informing a parent and asking for consent for an abortion, 17 year old pregnant females may wait until they turn 18 years old to obtain an abortion. Unfortunately, this delay in accessing an abortion may result in the gestation development into the second trimester. The data were analyzed for 17, 18, and 19 year olds obtaining second trimester abortions. For all races/ethnicities, 17 year olds had two more second trimester

abortions per 100,000 17 year old females in the consent time frame compared to the notification time frame. Eighteen year old females of all races/ethnicities had six more second trimester abortions per 100,000 18 year old females in the consent time period. When broken down by race/ethnicity, there were no significant results.

Although the 17 year olds had increased second trimester abortions, their number was less than the 18 year olds, which may support the hypothesis that these teens waited until they turned 18 so they may consent to an abortion. Another plausible explanation may be that of simple finances. Many of the 18 year olds could conceivably have graduated from high school and may be employed thus permitting the payment for the abortion.

Yet another effect upon the ability to attain a second trimester abortion lies in the availability of providers and facilities that offer them. In 2003, there were over 20 medical providers in Texas that would perform an abortion beyond 16 weeks' gestation. However, in 2004 the state passed a law that required the abortions 16 weeks' gestation or further to be performed in a hospital or in an Ambulatory Surgical Center (ASC). The requirements for the outpatient abortion facilities to become an ASC were difficult and expensive, thus resulting in all of the providers discontinuing the practice. This resulted in a decrease of more than 85 percent in second trimester abortions in Texas. In 2005, two providers were able to become certified ASCs and in 2007, there were four (Jones & Weitz, 2009). This physical limitation on the availability to obtain a second trimester abortion may have further limited the potential numbers for all ages of females in Texas.

Serving as a comparison group, the 19 year olds of all races also showed an increase in the rate during the consent time frame of four more second trimester abortions per 100,000 19 year old females. Blacks had an increase of 10 second trimester abortions per 100,000 19 year old Black females and whites saw an increase of five more abortions in the second trimester per 100,000 19 year old white females during the consent period. Whites also showed an increase of four more second trimester abortions per 100,000 19 year old white females during the notification period, the only age and race/ethnicity group to show an increase during this time frame. Further research delving into ethnicity and race inequalities is needed to fully understand these results, but one may surmise that the aforementioned socioeconomic status of whites as compared to minorities may permit the affordability of these services by the white females.

These data point to the conclusion that females aged 17, 18, and 19 across all races had an increase in second trimester abortions during the consent period. Moreover, 19 year old Black and white females had significant increases in these abortions. Many times, these females are in their second trimester and are exposed to increased medical risks as well as emotional distress. Increased access to abortion services and less restrictions related to parental involvement is needed to avoid this costly and potentially traumatic situation.

Limitations and Future Research

One of the limitations of this research is in the data themselves. These data are aggregated due to the need for privacy, thus individual data are not available.

Additionally, abortion data were not reported for the years of 1995 or 1996, lessening the study's power.

Another limitation of the research is the nature of the ARIMA model excludes the ability to include age and race/ethnicity as covariates, thus leading to multiple tests of significance. Some of the statistically significant findings, particularly with small rate changes, could be a statistical artifact of running multiple ARIMA models.

More research comparing other states without parental notification laws to Texas may be enlightening and will further the investigation of pregnancy prevention in teenagers and better access to reproductive health care. A much more thorough investigation in terms of race and ethnicity is needed to more fully understand the differences the data highlight between white females and minority females, as there are numerous times the results point to some type of inequality.

Summary

In summary, what effect did parental notification and consent laws have on the births, abortions, and birth outcomes for minors in Texas? Overall, parental notification and consent laws did seem to have an effect on the births, abortions, and birth outcomes for minors in Texas. Specifically, notification laws seemed to have the greatest impact on 16 – 17 year old females, reducing birth and abortion rates. The results were inconclusive in terms of the impact of the more stringent consent laws and the impact of both notification and consent laws on health outcomes such as low/no prenatal care, preterm delivery, and low birth weight birth rates. Findings did differ by race/ethnicity category. The race and ethnicity aspect should be further explored as there were many instances of

distinct results. Additionally, the results do suggest that although the consent law was more stringent, the effect of the notification law primarily resulted in statistically significant outcomes. The notification law seemed to be impetus enough to effect a change in behavior in the minor teens related to their pregnancies.

This research study extends the previous research studies, particularly ones done in Texas, in that it explores a 15-year time period from 1995 to 2005 covering two significant changes in abortion laws for minors. This is the first study to incorporate the effects of not only notification laws but also consent laws in Texas. The age groups included are also broader and include 13 to 21 year old females rather than the traditional focus on 15 – 17 year olds. The analyses utilized an ARIMA model which is a statistically more robust approach in that it models time series data before and after implementation of an "intervention" controlling for correlated data points and errors. Exploring data within the state of Texas using ARIMA also provides a stronger approach than simple mean comparisons of pre/post interventions across different states since the three law periods within the same state act as their own comparison groups.

Teens often exhibit poor choices and risky behaviors while pregnant. Their pregnancies are not planned and are often unwanted. Teens are most often financially dependent upon their parents, they are not educated, and are not well prepared to care for and raise a child (Stevens-Simon & Orleans, 1999). Legislation that reduces access for abortion services will help perpetuate the cycle in which the teens and their children find themselves. Teen pregnancy is a public health concern that requires the focus of the

community, policy makers, and individuals to find ways to test and implement effective strategies to prevent teenage pregnancy.

Texas is consistently in the top of the rankings in terms of teen pregnancy and teen births (Guttmacher, 2011). Little or no sexual education within the schools, difficult access to contraception information, and increasingly restrictive legislation in the state will keep Texas ranked higher than most other states in relation to teenage pregnancy and births. The well-established relationship between teenage births and costs to society, both direct and indirect, will remain strong in Texas unless there is an even greater reduction in births to teens.

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APPENDIX

Sample Output for Impact of Notification and Consent Laws on Birth Rate for Hispanic Females Ages 13 – 15

Birth rates for 13 – 15 year old Hispanic females were analyzed to determine normality. See Table A-1 and Figures A-1 and A-2 for normality test results.

Table A-1. Skewness/Kurtosis Tests for Normality of Birth Rate Data For 13 - 15 Year Old Hispanic Females

Variable	Obs	Pr(Skewness)	Pr(Kurtosis)	joint adj chi2(2)	joint Prob>chi2
13-15 Hispanic	180	0.0053	0.0000	40.82	0.0000

Shapiro-Francia W' test for normal data

Variable	Obs	W'	V'	z	Prob>z
13-15 Hispanic	180	0.91417	12.775	5.231	0.00001

Figure A-1. Histogram of Birth Rate Data for 13 - 15 Year Old Hispanic Females with Normal Distribution and Kernel Density Plot Overlay

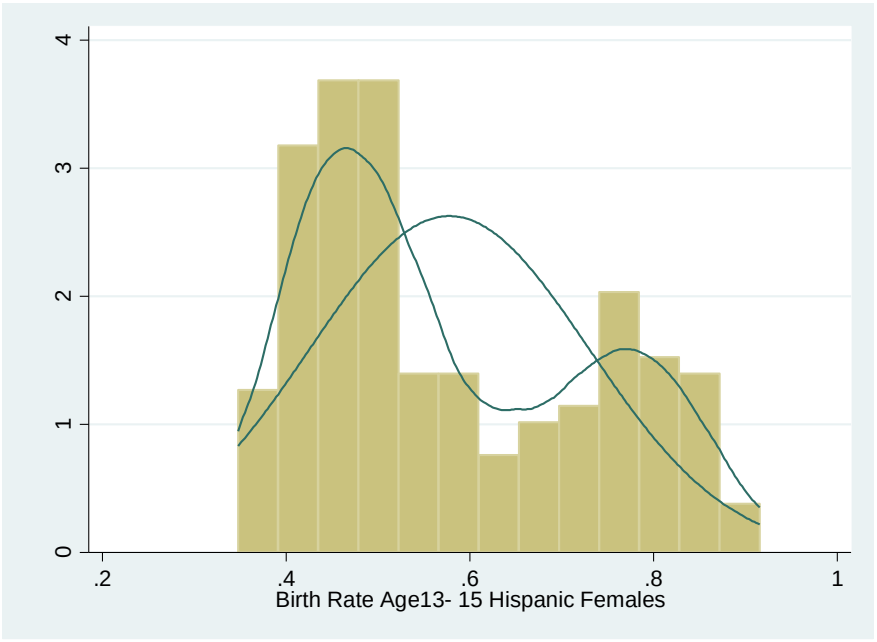
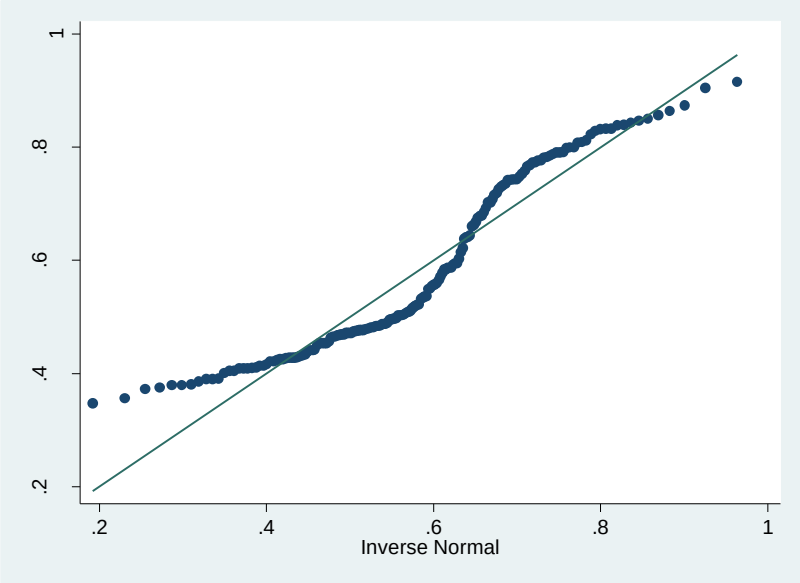
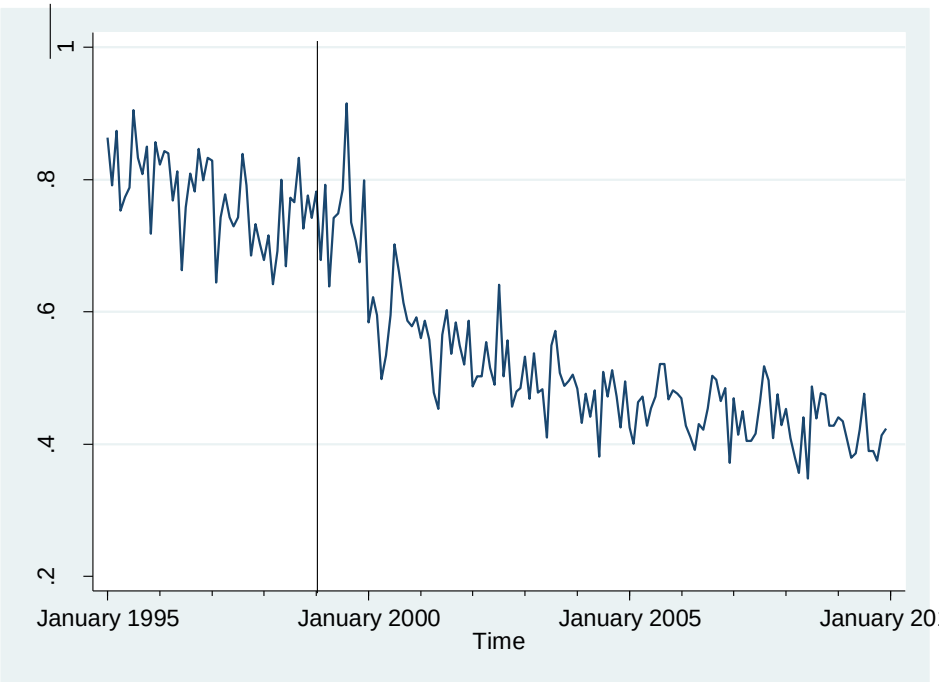


Figure A-2. Q-Q Plot of Birth Count Data for 13 - 15 Year Old Hispanic Females



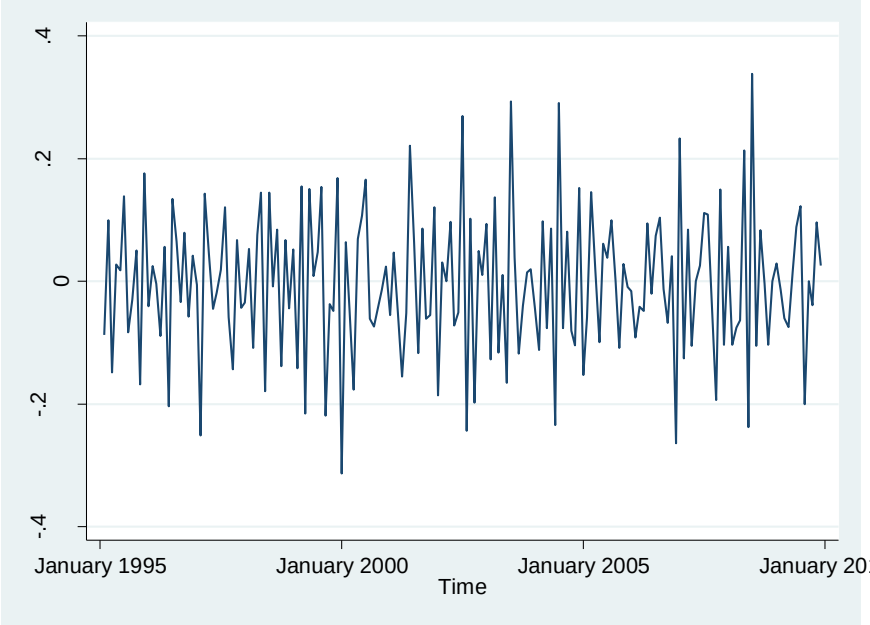
These data were not normal based on sktest and sfrancia test and histogram and qnorm visual review so were logged transformed. Next, a time series graph was created to review the time series nature of the data (see Figure A-3).

Figure A-3. Time Series Graph of Birth Rate Data for 13 - 15 Year Old Hispanic Females



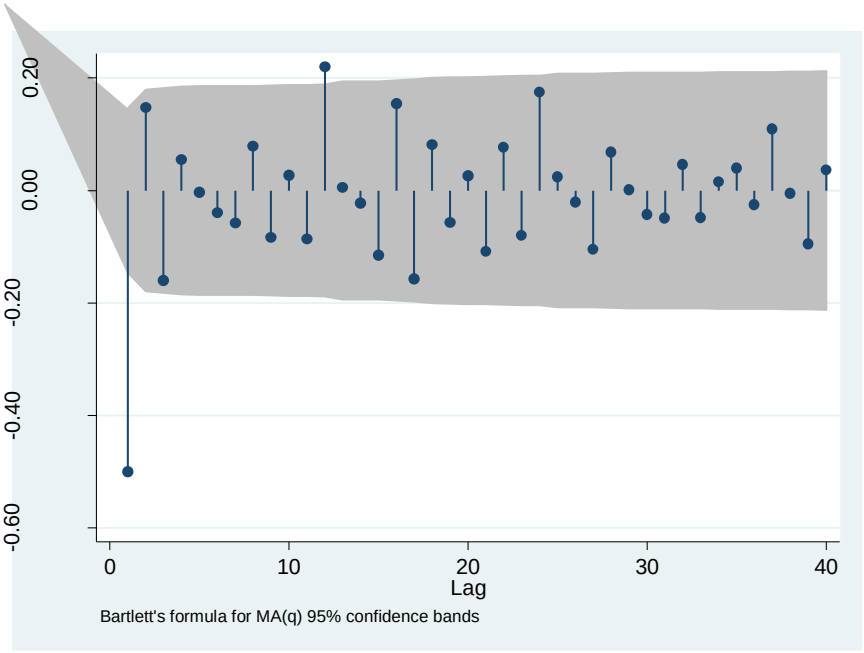
The data were not stationary so a first order difference was calculated to create stationary data. The resulting values varied around zero, so the differencing value for the ARIMA model was set to one (d = 1) (see Figure A-4).

Figure A-4. Time Series Plot of Birth Count Data for 13 – 15 Year Old Hispanic Females After First Order Differencing



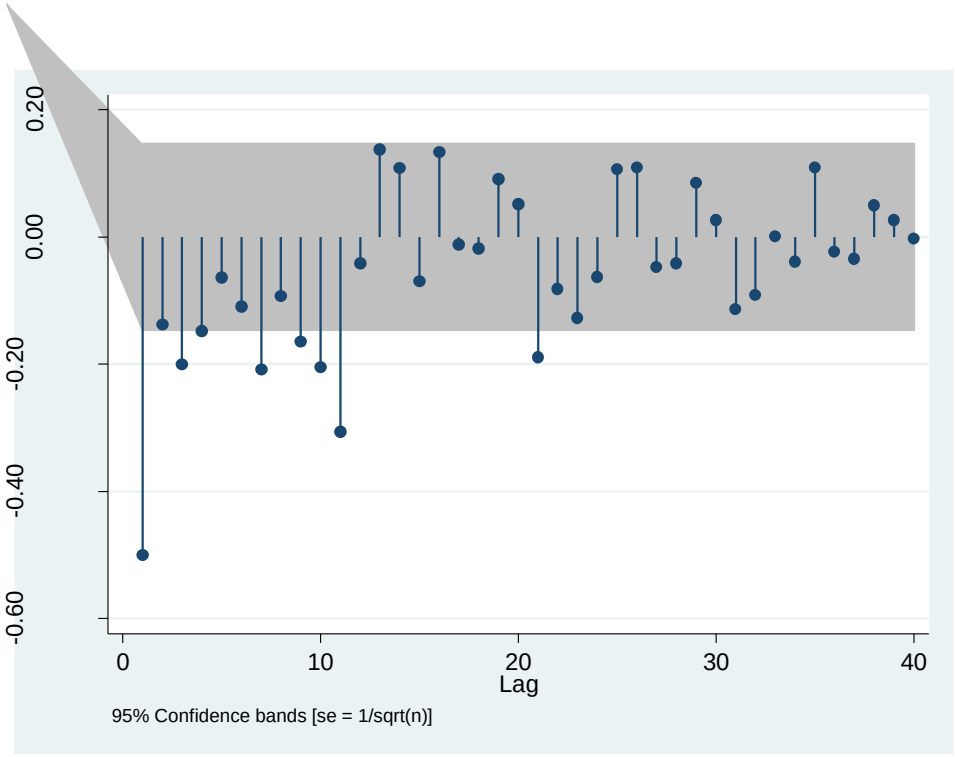
A correlogram was created to determine the value of the moving average (q) term (see Figure A-5). The first lag had a large value outside of the confidence band so the moving average value was set to one (q = 1).

Figure A-5. Correlogram of Birth Rate Data for 13 – 15 Year Old Hispanic Females



A partial correlogram was created to determine the value for the autoregressive term (p) (see Figure A-6). The first lag had a large value outside of confidence band so the autoregressive term was set to one (p = 1).

Figure A-6. Partial Correlogram of Birth Rate Data for 13 – 15 Year Old Hispanic Females



These values were used to create an ARIMA model with no predictors (1, 1, 1).

See Table A-2 for ARIMA results.

Table A-2. ARIMA regression results for (1,1,1) model with no predictors

```
Sample:  February 1995 - December 2009          Number of obs      =       179
                                                Wald chi2(2)       =    603.17
Log likelihood =  169.1822                      Prob > chi2        =    0.0000
------------------------------------------------------------------------------
D.                      |                 OPG
13-15 Hispanic          |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
------------------------+-----------------------------------------------------------------
Birth Rate              |
               Constant |  -.0040938    .001016    -4.03   0.000    -.0060852   -.0021024
------------------------+-----------------------------------------------------------------
ARMA                    |
                    AR  |
                    L1. |   .1645584   .0916079     1.80   0.072    -.0149899    .3441066
                        |
                    MA  |
                    L1. |  -.8840292   .0468971   -18.85   0.000    -.9759458   -.7921126
------------------------+-----------------------------------------------------------------
                 /sigma |   .0937124   .0050345    18.61   0.000     .0838449    .1035799
------------------------------------------------------------------------------
```

The AIC value was -330.36 and the BIC value was -317.68. The AR term was not statistically significant so the P term was set to zero and the ARIMA model (0,1,1) was run. The results of the modified ARIMA model are shown in Table A-3.

Table A-3. ARIMA regression results for (0,1,1) model with no predictors

```
Sample:  February 1995 - December 2009          Number of obs      =       179
                                                Wald chi2(1)       =    483.75
Log likelihood =  167.4455                      Prob > chi2        =    0.0000

------------------------------------------------------------------------------
D.                      |                 OPG
13-15 Hispanic          |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
------------------------+-----------------------------------------------------------------
Birth Rate              |
               Constant|  -.0040621   .0012455    -3.26   0.001    -.0065032    -.001621
------------------------+-----------------------------------------------------------------
ARMA                    |
                    MA  |
                   L1.  |  -.8310839   .0377863   -21.99   0.000    -.9051438   -.7570241
------------------------+-----------------------------------------------------------------
                /sigma  |   .0946408   .0050779    18.64   0.000     .0846883    .1045933
------------------------------------------------------------------------------
Note: The test of the variance against zero is one sided, and the two-sided confidence
    interval is truncated at zero.
```

The model fit improved with the revised ARIMA model as evidenced by a lower AIC value as shown in Table A-4.

Table A-4. AIC and BIC values for ARIMA model

```
Akaike's information criterion and Bayesian information criterion

-----------------------------------------------------------------------------
       Model |    Obs    ll(null)   ll(model)     df          AIC         BIC
-------------+---------------------------------------------------------------
           . |    179           .    167.4455      3     -328.891   -319.3288
-----------------------------------------------------------------------------
               Note:  N=Obs used in calculating BIC; see [R] BIC note
```

The ARIMA model (0,1,1) with no seasonal differencing did not have any statistically significant predictors for law period (None vs. Notification or Notification vs. Consent). Therefore, the data were seasonally differenced (differencing period = 12

months) and the ARIMA model applied to the seasonally differenced data. See Table A-5 for results of the ARIMA model.

Table A-5. ARIMA regression results for (0,1,1) model with seasonal differencing and None vs. Notification predictor

```
ARIMA regression

Sample:  February 1996 - December 2004          Number of obs      =       107
                                                Wald chi2(2)       =    400.66
Log likelihood =  90.88771                      Prob > chi2        =    0.0000

------------------------------------------------------------------------------
D.           |                 OPG
13-15 Hispan |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
Seasonally   |
Differenced  |
-------------+----------------------------------------------------------------
None vs.     |
Notification |
         D1. |  -.2219178    .050818    -4.37   0.000    -.3215192   -.1223163
             |
       _cons |   .0022816   .0010588     2.15   0.031     .0002065    .0043568
-------------+----------------------------------------------------------------
ARMA         |
          ma |
         L1. |  -.9238599   .0461787   -20.01   0.000    -1.014369   -.8333513
-------------+----------------------------------------------------------------
      /sigma |   .1025572   .0084051    12.20   0.000     .0860835    .1190309
------------------------------------------------------------------------------
Note: The test of the variance against zero is one sided, and the two-sided
    confidence interval is truncated at zero.
```

After controlling for seasonal differences, the indicator variable, None vs. Notification, is statistically significant indicating that 13-15 year old Hispanic females had a 0.22 log units lower birth rate (births per 1,000 13-15 year old Hispanic females) per month after the notification laws were enacted (2000 – 2004) compared to the no law period (1995 - 1999).

To create more interpretable results, the data were unlogged and the model was rerun. The results are shown in Table A-6.

Table A-6. ARIMA regression results for (0,1,1) model with unlogged data, seasonal differencing and None vs. Notification predictor

```
ARIMA regression

Sample:  February 1996 - December 2004          Number of obs      =       107
                                                Wald chi2(2)       =    357.41
Log likelihood =  133.1194                      Prob > chi2        =    0.0000

------------------------------------------------------------------------------
D.           |                 OPG
13-15 Hispan |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
Unlogged     |
Seasonally   |
Differenced  |
-------------+----------------------------------------------------------------
None vs.     |
Notification |
         D1. |  -.1546211   .0355168    -4.35   0.000    -.2242327   -.0850096
             |
       _cons |   .0016856   .0008289     2.03   0.042     .0000609    .0033103
-------------+----------------------------------------------------------------
ARMA         |
          ma |
         L1. |  -.9043757    .047892   -18.88   0.000    -.9982423   -.8105092
-------------+----------------------------------------------------------------
      /sigma |   .0691845   .0052615    13.15   0.000     .0588722    .0794968
------------------------------------------------------------------------------
Note: The test of the variance against zero is one sided, and the two-sided
    confidence interval is truncated at zero.
```

After controlling for seasonal differences, the indicator variable, None vs. Notification, is statistically significant indicating that 13 - 15 year old Hispanic females had a 0.15 lower birth rate (births per 1,000 13-15 year old Hispanic females) per month after the notification laws were enacted (2000 – 2004) compared to the No law period (1995 - 1999). No significant differences were found for the Notification vs. Consent indicator variable.